Master's Thesis
Supervisor: Thomas Z. Ramsøy
Co. Supervisor: Dalia Bagdziunaite

Lisa Maria Landvogt

Amelia Maria Malpiedi

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AD SUCCESS
at the cost of
BRAND MEMORY

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Executive Summary

Neuroscientific studies have proposed that it is primarily emotions and not rationality that plays a vital part in influencing decision-making, perception, memory, and behaviour. Therefore, an understanding of emotional processes is vital for successful branding, as it depends on understanding and developing an emotional appeal towards consumers. In terms of this thesis, brand memory is considered crucial for branding activities, as all brand decisions are at least practically based on memory. However, as emotional processes cannot be investigated using traditional research methods because they are reflected in the brain and physiological reactions, it is proposed to apply neuroscientific research studies. Thereby, generated knowledge can be used to develop a better understanding of how emotional processes influence consumer memory.

Despite the widespread recognition of the importance of emotions in advertising by practitioners and scholars, no systematic research on how it relates to advertising effectiveness based on brand memory has been conducted. This study will contribute to recent developments in two ways.

First, it will reflect on the theoretical foundations of marketing, demonstrating that traditional models based on the rational consumer are out-dated and that new models including the intuitive consumer, driven by emotions are needed. Furthermore, it will be discussed that memory of a brand is crucial for advertising success, as consumers do not make purchase decisions during ad exposure. To underline the theoretical literature review, this study contributes in a second manner, namely by investigating how emotions influence memory formation during ad exposure. Here the authors distinguish between ad and brand memory, because cues that are typically used during brand decisions, may not be retrieve from an ad, but from brand memory. The issue is explored through a laboratory experiment, using over 100 participants to view 16 TV commercials. During the experiment neuroscience tools such as the EGG and facial coding were used. The findings of the study have shown that ad-induced emotions do have a crucial impact on memory formation, where results were not always as expected. Emotions are found to be a complex matter, which must be looked at in great detail. The findings therefore reinforce the importance of further research in the area, supporting neuromarketing as a field with increasing interest. Moreover, from the presented study valid new insights informing the academic and corporate fields about the internal mechanisms of advertising effectiveness can be drawn.

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Part 1: Introduction

"I'm sure I'm wasting at least half of my advertising budget.
The trouble is I don't know which half!"
John Wanamaker (1838-1922)

Who doesn't remember the Evian ad with the roller-skating babies? It went viral in 2009 as one of the most successful advertisements. The ad received more than 100 million views, won numerous awards, and was nominated as one of TBS' Funniest Commercials of the year (O'Leary, 2010). However, during that same period Evian lost market share and its sales dropped by 25%. When researching other ads that have been successful in terms of going viral and winning creative awards, Evian's ads are not alone in being financially detrimental for the company. Super Bowl breaks are known worldwide for showing the most creative and entertaining ads of the year (Pavelchak, et al., 1988). However, a study from 2014 by the advertising consultancy Commuicus found that 80% of the brands with Super Bowl ads did not increase sales or purchase intent in the period after the Super Bowl (Morphy, 2014). Commuicus' CEO states that marketers have become too focused on creating entertaining ads, whilst forgetting other important elements (Smith, 2014). This leads to the question of whether entertaining ads are actually beneficial for brands, or even be harmful (Edwards, 2013). Until today research has been inconclusive on the meaning of ad success.

Ad agencies and marketers spend a great deal of time and money to understand how consumers think, feel, make decisions and test the effectiveness of their ads. Still, no consensus has emerged of what the purpose of advertising should be and how it should best be evaluated. Most scholars agree on the need for advertising to create emotional responses for it to be effective (McDuff, et al., 2013). Further, it has been stated that the more attention acquired, the stronger the memory (Mehta & Purvis, 2006). At the same time, research has been inconclusive on how exactly emotions impact advertising success and how it can be measured and evaluated.

It has been argued that in most cases consumers do not make brand decisions during ad exposure (Percy & Rosenbaum-Elliott, 2012). This underscores the importance of the memory of the advertisement, especially the brand for an ad to effectively affect actual buying behaviour. Keller (1987) describes that ad memory consists of what consumers learn, feel, see, or hear when watching the ad. However, even though consumers might emotionally engage with the ad and consequently form memories, it is not guaranteed that the ad linkage between ad and brand memory is created (Steidl, 2014). Based on the before mentioned Evian ad and Super Bowl ads it is a valid assumption

that these entertaining ads will form ad memory in the viewer's mind. However, what if they fail to remember the brand? Consequently, the ads will have difficulty affecting purchase behaviour, therefore decreasing their effectiveness. Furthermore, supporting the importance of brand memory, it has been argued that during the actual purchase, consumers will seldom think about the ad but instead choose products or services driven by the brand (Du Plessis, 2005).

As Millward Brown Lansdowne (2005) states, memorable advertising needs to be enjoyable and involving, but above all, linked to the brand. This throws up the assumption that when advertising is very entertaining, attention is focused on the ad's content and story, rather than on the brand itself with the consequence that no brand memory is being created. So what if the advertisement is 'too good' resulting in consumers solely focusing on the ad content, and thereby obstructing brand memory formation? To further investigate these considerations the following research question has been developed:

How do ad-induced emotions affect the viewer's memory formation towards the ad, the advertised brand, and the linkage between the two?

In other words, this thesis will examine if there can be advertising success without brand success or the opposite, brand success without ad success. Thereby a better understanding of the drivers and barriers of advertising effectiveness is created. The research question will be approached by first providing a profound literature review demonstrating how marketing literature has traditionally approached brand memory followed by a more recent view, influenced by neuromarketing insights. Several hypotheses derived from the pertinent literature are presented. The research method, experimental design, and results are then discussed. Finally, the authors will draw on the results to form conclusions for both academics and marketers, with the goal of providing a better understanding of brand memory and how this knowledge can be used to improve advertising.

1.1 Topic Relevance

Despite the widespread increase of emotional advertising supported by practitioners and scholars, to the authors knowledge no systematic research has been conducted to examine how emotional responses relates to brand memory and therefore ad effectiveness. The term "ad effectiveness" seems to be used extensively between marketers, even though the importance of linking the ad to the brand seems too often be forgotten. The present research attempts to fill the gap, by addressing creating a better understanding of ad-induced emotions and how they affect brand memory

formation. Thereby, this paper will deepen the understanding of successful advertisements, as well as demonstrate how neuromarketing can support this understanding by measuring emotions.

More concretely, this thesis is integrating different concepts at the intersection of branding, marketing, and neuroscience. The question of what effective advertising is has been an on-going discussion for decades, where now neuroscience tools are used to gain a better understanding of consumers, their behaviour and brand choices. As described above, the authors believe that often marketers are focusing on creating creative ads that grab attention. However, it can be assumed that brand memory is often not the main goal, or even forgotten, which appears questionable given the importance of brand memory (Steidl, 2014)

Research has shown so far that virtually all brand choices are at least partially memory-based (Walvis, 2007). As mentioned, Du Plessis (2005) found that more than half of the time, consumers are not able to recall the advertised brand, when recalling an ad. At the same time, he found that often consumers might recall an ad but associate it with the wrong brand, and often a competitor within the same product category. These findings give reason enough to gain a better understanding of how brand memory is formed.

Furthermore, looking at recent developments in advertising it becomes evident that many marketers are more and more using emotions to gain attention, trying to increase brand memory. As it will later be explained, consumers only have a limited capacity of the working memory. Here consumers are more likely to pay attention and remember things that are emotionally relevant to them (Hollis, 2013).

This study will contribute to the above-mentioned issues, aiming at providing a better understanding of brand memory. Bringing together different concepts such as emotions in advertising and brand memory formation, this study will not only integrate existing marketing theories, but will add on to this with new neuromarketing insights. This study will therefore be of theoretical significance for the research community as well as practical significance for marketers in for instance ad agencies. To do this, the use of neuroscience tools with a set of 16 ads will be examined, analysing how neuromarketing can be beneficial to the discussion, in this case how brand memory formation can be predicted and better understood. Thereby not only adding to the existing advertising literature, but also providing new input for marketers, in order to improve advertising initiatives.

1.2 Structure of the Thesis

Generally, it is our objective to achieve focus, consensus, and coherence between the main parts of the thesis. Therefore the following structure will be followed.

Figure 1: Structure of the Thesis

1.3 Delimitation

The disciplines that are dealt with in the paper are very large in scope. It is therefore necessary to limit the discussion within each discipline in order to identify key elements. The theoretical and methodological delimitations will be presented in this section.

1.3.1 Marketing

Within marketing there are a wide variety of different approaches and models, reflecting on the relationship between the marketer and consumer (Heding, et al., 2009). Plassmann, Ramsøy, and Milosavljevic (2012) have created a model of decisions and branding effects. The model provides a good overview of the consumer journey and therefore can be used to specify which part this thesis

focuses on. The model divides the consumer's journey into four basic components, which are required for brand preference formation. The first component is (1) Representation and Attention. Here, the consumer is exposed to the brand for the first time, where after the second component (2) Predicted Value follows. In this stage, the consumer has certain expectations towards the brand. Following is the component of (3) Experienced Value, where the consumer tries the brand and forms values. Throughout these stages the last component of (4) Remembered Value and Learning occurs, which is based on previous experiences of the brand. During this thesis the authors will delimit the subject to solely consumers in the first stage, namely Representation and Attention. Here, the subjects will be presented to the brand for the first time via an advertisement thereby the fourth stage will also be affected as participate will form memories during the experiment.

Having discussed the consumer journey, this delimitation is also applicable to the traditional marketing mix (De Pelsmacker, et al., 2010). As this thesis focuses on branding and advertising and the exposure to if, other components that such as price and place, which follow later on in the consumer journey will not be discussed. This is due to the fact that they are not considered relevant when addressing the research question. However, the paper will introduce the most important branding elements, to create a foundation for the research. Further, the most commonly used models within marketing communications will be introduced, such Response-Hierarchy-Models, the Elaboration-Likelihood Model and information processing models (Belch & Belch, 2003; De Pelsmacker, et al., 2010; Vakratsas & Ambler, 1999) to gain an understanding of how advertising campaigns have traditionally been built and how they define advertising goals. Due to the limited scope of the paper, models will only be briefly introduced and discussed.

Furthermore, advertising can broadly be distinguished between brand building ads and direct call-to-action ads (Genco, et al., 2013). This thesis focuses on brand building ads, since the concept of brand memory is more relevant in this case. Accordingly, ad effectiveness is described as an ad that evokes a strong attention and emotional responses and ensures that the audience creates brand awareness, which is measured through brand memory (Silberstein & Nield, 2008). As the literature review will show, traditionally many markets have defined different advertising goals. These goals will be mentioned and discussed to get a broad understanding of the different scholar's views, whilst the view of brand memory being the result of ad effectiveness will be used throughout the paper.

Moreover, during writing of the literature review, a problem encountered was that terms in the marketing literature are often not clearly defined, such as the definitions of **ad effects** and **ad effectiveness**. The two concepts are used interchangeable, even though they are different. Both academics and practitioners are having a hard time describing what ad effectiveness is and how to measure it. Advertising effectiveness is concerned with creating tangible contributions for a brand or company, where the benefits should exceed the advertising costs. At the same time ad effects can be described as a more concrete outcome, which can be measured in an experimental setting, involve individual ad responses and are generally limited to a number of executions and exposures (Wright-Isak & Faber). It needs to be noticed that a main difficulty that remains is isolating advertising effects, because advertising is merging in with other broader elements of the message environment (Wright-Isak & Faber, 1997). This makes it difficult, if not impossible, to show how advertising directly impacts sales. Even though it might not be achievable to show the impact on sales, it is feasible to specify an effect such as change of awareness or attitude and then measure it before and after an ad exposure. According to Haugtvedt and Priester (1997) it is possible to measure the success of a communication by its ability to influence memories, attitudes, and audience beliefs. However, one can differentiate between short-term and long-term effects. Short-term effects might influence sales, brand perception or awareness and attitude. Contrary, with a long-term focus effects can cumulate, thereby creating an image of a brand in the consumer's mind that is relatively stable over a long period of time (Wright-Isak & Faber, 1997). After having explained the difference between ad effectiveness and ad effects, it should be noticed that most literature broadly refers to it only as ad effectiveness; therefore in the remaining paper the same approach is followed.

1.3.2 Neuroscience

Using neuromarketing tools for the experiment, an introduction of the topic needs to be given. However, as the subject is very broad and extensive, this thesis is delimited to the following three topics; (1) emotional and cognitive processes induced by the given marketing information (McClure, et al., 2004; Plassmann, et al., 2008), (2) attention (Bargh & Chartrand, 2000; Chartrand, et al., 2008), and (3) the memory system (Ramsøy, 2014; Baars & Gage, 2013). These topics are furthermore restricted to neuromarketing implying that specific biological explanations of the different brain regions will not be discussed. These limitations are due to the relevance of the study's subject.

In addition to the terms just mentioned, it is important to define what is meant by consciousness and unconsciousness throughout the thesis. Among scholars **consciousness** is defined as the ability to be aware of an event and to be able to report it whereas unconsciousness takes part below the awareness threshold (Dijksterhuis & Aarts, 2010). However, there is still a debate about defining unconsciousness, since it seems to be used interchangeably with words such as subconsciousness and non-consciousness (Baars & Gage, 2013). **Unconsciousness** is mostly associated with Freud (1915) and psychoanalysis. He used the term **subconsciousness** interchangeably with unconsciousness. Although the word "subconscious" continues to appear in the lay literature, it is rarely precisely defined. Additionally, the term **non-consciousness** is a third terminology. It is seldom used among scholars, and instead refers to processes that are completely outside the realm of our consciousness that still operate as brain states (Corsini & Wedding, 2011).

The authors of this thesis will take use of the term "unconsciousness", defined as the condition of not having experiences about particular events, stimuli, or thoughts while still being awake and alert (Ramsøy, 2014). These unconscious processes are effortless and automatic, and can become conscious at times (Bargh & Chartrand, 2000).

1.3.3 Experiment Design

This thesis' research experiment was conducted in a hypothetical environment in a highly controlled lab simulation situation in the Senselab at CBS run by the DNRG (Department of Marketing, 2014). The results of this experiment are pioneering in this field and give insights for future academic investigation. However, the authors delimit this paper from external aspects such as pricing, competitors, and location of ad effectiveness, due to testing in artificial environment.

The sample population was limited to the age range of 18-35 years. This is due to validity reasons, which will be further discussed in the validity section. Additionally, because the study was held in Denmark, the majority of participants were Danes.

The advertising stimuli are based on randomisation, since each individual has seen the ad once, and in a random order to avoid the sequence exposition effect (Agresti & Franklin, 2012). Overall, the conditions for ad processing were atypical for three reasons: (1) ad exposure was compressed (all 16 ads were seen in a 2 x ten-minute span); (2) ad exposure was forced, thus, although the process was designed so that subjects could process the ads differently (depending on their ad or brand focus). Consequently, all subjects were processing in a fairly high involvement state, since there

were only two small distraction screens and participants were seated very close to the big screen with the ad stimuli; and (3) ad exposure was limited, as each ad was only seen once. All three of these factors may have important implications for the ad- and brand memory created. The research design will be discussed further in Part 6: Limitations, where validations will be deliberated.

The boundary set for the advertisements used in the experiment has been limited to unknown brands. Here, the authors will not have to take aspects of different levels of former brand associations, and therefore preferences, into concern. Brand knowledge affects the preference since it can increase liking based on the mere exposure effect (De Pelsmacker, et al., 2010). If these factors were used without taking proper precautions into concern, the results would have a huge validity challenge.

To the best knowledge of the authors there has not been any similar research concerning the area of interest. It should further be noted that interpretations and studies of brain activity are evolving every day. Thus, new research is being published continuously and therefore it might be that certain examples of future perspectives are already shown or will soon be out-dated.

Part 2: Reviewing the Literature

In order to gain a profound understanding of crucial marketing and neuroscience aspects, a comprehensive literature review will be given. The most relevant branding and marketing terms will be discussed followed by introducing the most common marketing models. This will demonstrate that even though brands are becoming more relevant in today's marketing world, the most common marketing models have not changed. Challenging out-dated marketing models a more recent perspective of consumers will be given. This will be followed by an introduction of neuromarketing, as this approach can be used to gain a better understanding of consumer behaviour and brand preferences.

By combining and discussing both marketing and neuroscience, the research gap will be defined and the research question will be formulated. The gained understanding will then benefit the authors' search of adding value to the problem of the consumer's brand memory formation.

2.1 The Secret of Branding – From a (Neuro)Marketing Perspective

"*A brand for a company is like a reputation for a person.*
You earn reputation by trying to do hard things well."
Jeff Bezos (2004)

In the beginning of the literature review, an introduction of the most important branding aspects will be given. The aim is not only to gain a better understanding of what a brand and brand equity are, but also to demonstrate that marketing and neuromarketing are using different terms such as brand awareness and brand attitudes, opposed to brand memory and brand associations, but ultimately describing the same concepts.

According to the American Marketing Association (2014) a **brand** can be defined as a "*name, term, design, symbol, or any other feature that identifies one seller's good or service as distinct from those of other sellers*". Further, they state that a brand in itself can be seen as a customer experience, representing a collection of images and ideas. Kotler and Keller (2012) argue that a brand will either add a rational and tangible dimension or a symbolic, emotional, and intangible dimension to a product that will differentiate it from others. From a neuromarketing point of view "*a brand is a concept stored in memory within a network, linked to a variety of other nodes, which make up the brand associations*" (Genco, et al., 2013, p. 142). Ramsøy (2014) describes a strong brand as one that triggers deep associations with related ideas that keep that brand "top-of-mind" for consumers, which can lead to strong connections in long-term memory, making leading brands hard to displace.

Brand equity is a concept used to assign a value to a brand (De Pelsmacker, et al., 2010), meaning the added value a brand gives to a product or service (Cobb-Walgren, et al., 2013). Therefore, brand equity will be reflected in how consumers think, feel, and act with respect to the brand, as well as prices, market share and profitability. Brand equity is usually described in two different ways – in financial- and consumer-based terms. The financial term of brand equity includes factors such as the monetary value of the brand and can be based on a financial analysis or a brand strength score (Kotler & Keller, 2012; De Pelsmacker, et al., 2010). Consumer brand equity is instead based on the impact that brand knowledge has on consumer behaviour (Kotler & Keller, 2012) and can be described as the extra marketing value that the brand gives to a product. However, the two terms are closely aligned, as one can argue that brand value is created in the mind of consumers where no financial value will exist if a brand does not provide value to consumers (Cobb-Walgren, et al.,

2013). At the same time Du Plessis (2005) has a stronger focus on the neurological perspective and describes it as all feeling, associations and memories a consumer has related to a brand. Marketing communications will then determine and strengthen brand equity. Here advertising is a strong influencer of brand equity by creating brand awareness, brand associations, and/or influences usage experience (Aaker & Biel, 1993).

As stated by Kotler and Keller (2012), **brand awareness** acts as a building block for brand equity. Brand awareness is a concept that marketers can use to quantify levels of consumer knowledge and awareness of the brand's existence (American Marketing Association, 2014). De Pelsmacker and colleagues (2010) further distinguish between deep and broad brand awareness, where deep brand awareness refers to the brand coming to mind easily and enjoying high top-of-mind awareness and broad brand awareness describing that the brand often comes to mind in different usage situations, such as when the consumer makes use of the product. The assumption is that the two will have a strong influence on the consideration set of consumers, which includes the set of brands that are taken into serious consideration by the consumer when making a purchase decision (Kotler & Keller, 2012). Further Percy and Rosenbaum-Elliott (2012) describe brand awareness as the link in memory between a given brand and the need it fulfils. However, Keller (2001) asserts that awareness is more than just knowledge of the brand; it also involves linking the brand to certain associations in memory. According to De Pelsmacker and colleagues (2010) brand awareness can be measured via brand recall and brand recognition. Recall refers to the unaided spontaneous awareness and recognition refers to aided awareness where consumers recognize a product based on its logo, packaging or something similar.

Brand attitude is a second important driver of brand equity and is described as the combination of what consumers know about a brand and any feeling they associate with it. Brand attitude thereby reflects the link between a brand and its benefit for the consumer (Percy & Rosenbaum-Elliott, 2012). Further, it can be defined as the perceived value of a brand to a consumer (De Pelsmacker, et al., 2010). From a consumer behaviour perspective it contains two components described as cognition (beliefs) and affect (feelings). It should be mentioned here that brand attitude can be considered a relative concept where one brand will be evaluated as relatively better than the other (Percy & Rosenbaum-Elliott, 2012). Usually brand attitude will then, unintentionally, help consumers evaluate whether a given product will be able to meet the given need (Kotler & Keller, 2012). Accordingly, is reasonable that brands should try to create positive brand attitudes.

Moreover, brand attitudes are the reason why it is important for the brand to be visible around the target group on a regular basis in order to create and strengthen the consumer's associations about the brand (De Pelsmacker, et al., 2010).

Having discussed brand awareness and brand attitude, two of the most relevant branding concepts, it should be mentioned that within the neuromarketing literature these concepts are not as frequently used. However, brand memory and brand associations are very well discussed topics where brand awareness is similar to brand memory and brand attitude is usually based on brand associations. Keller and Lehmann (2003, pp. , p.28) define **brand memory** as "*everything that exists in the minds of customers with respect to a brand (e.g. thoughts, feelings, experiences, images, perceptions, beliefs, and attitudes)*". Hence, it is to a large extent the **brand associations** that consumers have (Aaker, 1991; Keller, 1997). The strength of a brand is evaluated based on the richness and diversity of associations in the consumer's mind (Genco, et al., 2013) where it has been proven that there is a positive relationship between the number of associations consumers have about a brand and preference (Ramsøy, 2014).

As the discussion has shown, one can conclude that both branding and neuromarketing theories consider similar factors by describing what consumers remember and feel about a brand. Although they use different definitions, the discussion has shown that parallels can be drawn between brand awareness is very similar to brand memory and brand attitude has much in common with brand associations. Moreover, similar recall and recognition tasks are used to evaluate the different concepts. Therefore, in this thesis the term brand memory will be used as the overarching concept. Below it will further be described how consumers form memories when discussing memories from a more neurological perspective. This will help to better understand the concepts of brand awareness and brand memory.

2.2 Unravelling Advertising

"*I've learned any fool can write a bad ad*
but it takes a real genius to keep his hands off a good one"
Leo Burnett (2005)

After having introduced the most relevant branding concepts in terms of this thesis different advertising models are now introduced. As the overall goal of this thesis is to gain a better understanding of brand memory to improve advertising it is necessary to gain a better understanding

of current advertising methods. The discussion will start by introducing the aims of advertising, which will be followed by an introduction of two different types of consumers, namely the rational and the intuitive consumer, and how these differ in processing a marketing message. After this, advertising effectiveness and different traditional measurement approaches will be discussed.

2.2.1 Aims of Advertising & Consumers Decision Making Processes

The first and most obvious advertising goal that many would name is to increase sales (Percy & Rosenbaum-Elliott, 2012). However, it has been proven difficult to measure direct effects on sales as advertising is blending in with other marketing mix elements and broader elements of the message environment (Wright-Isak & Faber, 1997). This makes it difficult to establish a causal relationship between advertising and sales impact. However, it can be argued that advertising is used to strengthen brand equity; here ads are being used to create an emotional connection to the brand (Genco, et al., 2013). Du Plessis (2005) further describes that advertising can either be used to create new associations for a brand or keep existing brand associations fresh in consumers' minds. The basic idea resulting from this process is that the established associations will be activated during the consumers purchase decision and will thereby positively influence sales (Genco, et al., 2013). This is also in line with the discussion that brand attitude and brand awareness are the two building blocks for brand equity (Percy & Rosenbaum-Elliott, 2012). Consequently, advertising that focuses on brand awareness and brand attitude or in other words create strong brand associations will strengthen brand equity resulting in a higher likelihood of consumers buying the brand.

However, it should be noticed that recent research suggests that most of this takes place at an unconscious level which will make it difficult for consumers to explain their purchase behaviour (Genco, et al., 2013). It is therefore crucial to gain a better understanding of consumers' decision-making processes in order to strengthen brand equity. Here Kahneman's model of "bounded rationality" can be applied (Kahneman, 2003). His assumption is that rational economic models are unrealistic from a psychological viewpoint because many choices and judgments are based on intuition. He therefore introduces a model centred on two different decision-making systems where he distinguishes between intuition and reasoning. System 1 is effortless, automatic, and fast and can be labelled an intuitive decision-making system, often guided by habits. System 2 is based on reasoning and can be called a deliberate decision-making system, which is slow, controlled and takes effort. Genco, Pohlmann, and Steidl (2013) applied Kahneman's model to purchase decisions

and differentiate between two consumers: the rational consumer who is consciously persuaded by rational arguments and aware of his purchase decisions, and the intuitive consumer who uses unconscious cues during purchase decisions, not being aware of the factors influencing it. To better understand how advertisers have traditionally addressed consumers and how they should address consumers following Kahneman's argumentation of intuition, two different approaches of advertising will be explained.

2.2.2 Communicating with the Rational Mind

Based on traditional economic models marketers thought of consumers being purely rational and logic decision makers in this study referred to as the **rational consumer**. Østergaard and Jantzen (2000) compare the consumer to a computer that is constantly processing information received from the environment, presuming "*that the human being is rational in its information processing and that it can learn to form beliefs about complex situations*". Following this, consumers are expected to retrieve information completely and accurately at any point after it was encountered (Genco, et al., 2013). Thus people are anticipated to always consciously process information before forming a decision (Dijksterhuis, et al., 2005), where rationality determines the consumer's preferences and the consumer uses cost-benefit calculations to make a purchase decision.

The ultimate goal of advertising for most marketers has often been described to create a behavioural response to increase sales (Percy & Rosenbaum-Elliott, 2012). Here traditionally the purpose of advertisements was to present logical arguments to encourage the rational consumers to purchase a product (Genco, et al., 2013). Marketing research has accordingly been trying to predict how consumers will respond to advertising they are being exposed to. An overview of different models that have been developed to understand how consumers react to exposure of advertising messages will be introduced.

2.2.2.1 Old-School Marketing

McGuire's information processing paradigm is a good starting point as it suggests six behavioural stages that need to be passed for a message to be effective (McGuire, 1972). Firstly, the message must be presented to the consumer; the consumer must pay attention to it, comprehend it, yield to it, and then retain the message until acting upon it. McGuire's reasoning is based on common sense assuming that if the consumer does not see the message, that the message cannot work and likewise, if the consumer does not process the message, no effect can be created.

Hierarchy of effect models can be considered some of the oldest and most important influencers on marketing communication. The basic assumption for these models is that when processing a message, different effects will happen in a specific order (De Pelsmacker, et al., 2010). Here, the first effect is necessary for the second to occur. Often it has been hypothesized that for marketing communications to work consumers would have to pass three stages; a cognitive stage, an affective stage and a conative stage. These are also referred to as the think-feel-do sequence. At the first stage consumers mentally engage, thereby consciously forming awareness and knowledge. Second, the consumers enter an affective stage where emotions and feelings create an attitude toward the brand and lastly, in the conative stage, consumers undertake an action in respect to the brand. The oldest and best-known hierarchy of effects model is the AIDA model (De Pelsmacker, et al., 2010). The four steps of this model, which a consumer must experience in the given order, are: attention (the cognitive stage), interest and desire (the affective stage) and action (the conative stage) (De Pelsmacker, et al., 2010).

2.2.2.2 Taking the Direct Route

The Elaboration Likelihood model (ELM) integrates the above-discussed cognitive and affective elements and offers an explanation of how consumers process a message. Hence, it can be used to gain an understanding of message processing under what is labelled the direct route of advertising in this thesis. In the ELM this is referred to as central processing, where consumers are "*willing to elaborate on the information, to evaluate the arguments and find out what the information really has to offer"* (De Pelsmacker, et al., 2010, p. 93). For the process to take place the ELM states that three factors need to be given: motivation, ability, and opportunity. Motivation is the willingness to engage in behaviour, ability defines the resources needed to achieve a goal, and opportunity refers to whether the situation enables a person to achieve the goal. When all three factors are high, consumers are expected to engage in central-route processing (De Pelsmacker, et al., 2010). Depending on the quality and credibility of the provided information consumers will create counter, support, or neutral arguments, which in turn will lead to a positive-, negative-, or no attitude change.

What occurs if one of these factors is low will be discussed in section 2.2.3.1.

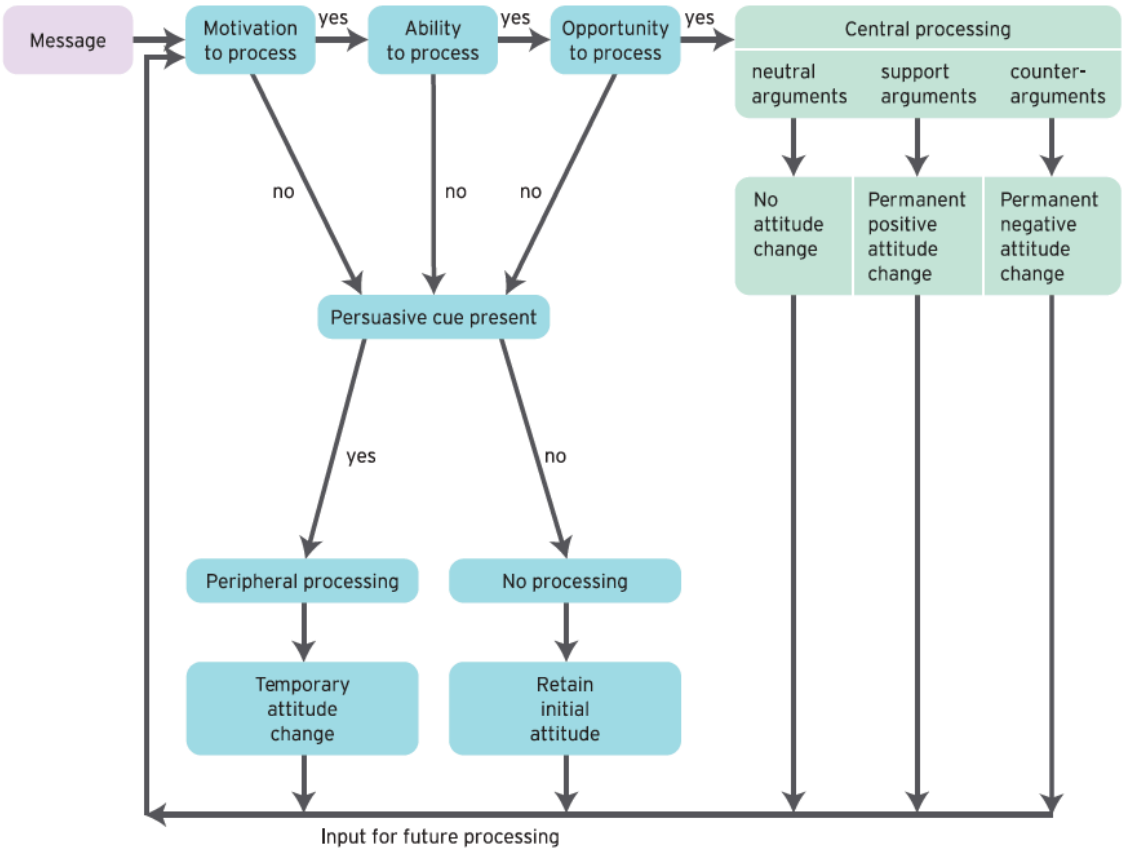


Figure 2: The Elaboration Likelihood Model (De Pelsmacker, et al., 2010)

2.2.2.3 Drawbacks of the Direct Route

The different approaches that have been discussed in the previous sections do not come without drawbacks. Hierarchy-of-effect models have been criticized because many academics doubt that the effects need to occur in a specific order (De Pelsmacker, et al., 2010). Furthermore, these models contain a highly cognitive stage. Following Kahneman`s (2003) argumentation of bounded rationality it's highly unlikely that consumers consciously debate opinions that are being presented in advertising. Moreover, marketing research has shown that nowadays people do not frequently pay attention to advertising and will therefore not actively engage in the message (Genco, et al., 2013). Research further shows that if people recall aspects of an ad it is usually the storylines and character that are evoked rather than the product claims or arguments (Millward Brown Lansdowne, 2005). Supporting this, studies have shown that ads performing well emotionally, but are not communicating a concrete message perform better (Wood, 2012). At the same time, if the consumer happens to pay attention to the claim they often form automatic counterarguments due to built-in resistance towards ads (Genco, et al.).

2.2.3 Communicating with the Intuitive Mind

As mentioned in the previous discussions different streams of research within economics, psychology, and consumer behaviour have supported the idea that decision making is not based on rationality but instead on intuition emphasizing the significance of the intuitive consumer (Genco, 2014).

The perspective of an **intuitive consumer** is mainly based on the research that consumers cannot explain why they chose one product over another. It is assumed that these mental processes involving perception, evaluation, and motivation do not happen under conscious awareness (Genco, et al., 2013). In contrast, brand choices are made fast, automatic, and effortless, largely taking place outside consumer's consciousness (Kahneman, 2003; Walvis, 2007). This is also in line with more recent consumer behaviour studies (Østergaard & Jantzen, 2000; LeDoux, 2003) demonstrating that consumers are not rational in their behaviour but instead more emotionally and narcissistically driven. While products are not necessarily consumed to satisfy a want or need, they are instead able to create experiences, or are used as means to identify with a reference group (Østergaard & Jantzen). Moreover, it can be argued that consumers try to avoid mental effort leading to better and more satisfying decisions (Walvis, 2007).

In order to address this intuitive consumer many companies have started to create emotionally involving ads focusing on creating positive associations with the brand (McDuff, et al., 2013). As mentioned, this is in line with Percy and Rosenbaum-Elliott (2012) stating that the role of every advertisement should be to strengthen brand awareness and brand attitude. But even more, the purpose of advertising is to form brand memory, which will then be able to prime future purchases (Steidl, 2014). Crimmins (1997) also argues that the relationship consumers' build up with brands can be compared to real friendships where one does not explicitly and deliberately considers who to choose or not choose as a friend. Consumers progressively form attitudes towards a brand and create emotional associations.

According to Genco, Pohlmann, and Steidl (2013), the indirect route is therefore a two step-model. First, advertising is used to strengethen brand attitude, memory, and intention. Whereafter, in a second step, brand attiudes and assoications will impact sales when retrieved at the point of purchase. One should note here that both brand attitudes and and associations are escially memory based concepts.

2.2.3.1 Taking the Indirect Route

The previously discussed Elaboration Likelihood model (ELM) has originally been developed to explain central processing. Here, one assumption has been that attitude change is mostly reached through cognition (Morris, et al., 2005). However, the model acknoweldges that information can also be processed peripherally and can therefore be applied to the the indirect route of advertising. It is assumed that if information is peripherally processed it will only form temporary attitude changes. The model further states that if one of the influencing factors of motivation, ability and opportunity is low, consumers are likely to process information peripherally. This entails that attitudes will be formed based on factors such as music, humor or attractivness of the advertisment (De Pelsmacker, et al., 2010). However, more recent scholars critize the ELM for not recognizing the importance of emotions enough (Morris, et al., 2005) demonstrating that emotions are crucial for attitude change. Morris et. al (2005) even go as far as stating that emotions are always at the core of procssessing even during cognitive processing.

More recent studies further support the indirect route and argue that attitudes formed via peripheral processing can also create long-term memories (Genco, et al., 2013). Crimmins (1997) states that most advertising messages are only processed unconsciously where the audience will react to peripheral cues and processing will therefore be unconscious, intuitive, and implicit. Three concepts are frequently discussed to further explain peripheral processing: attitude towards the ad, conditioning, and the mere exposure effect (De Pelsmacker, et al., 2010). The attitude towards the ad concept assumes that both brand attitude and purchase intention are influenced by the attitude towards the ad. Therefore, ad likeability can be considered an important factor, since it is able to attract attention and facilitate information processing (De Pelsmacker, et al.). One can argue that consumers will not consciously deliberate whether they like an ad or not. Furthermore, research suggests that feelings created by an ad influence brand attitude. Consumers that are in a positive mood make decisions faster, use less information, and evaluate things more positively. If the assumption that feelings toward a brand will be retrieved during brand evaluation were true, this would be able to influence the purchase decision at the point of sale (De Pelsmacker, et al., 2010). Emotional conditioning uses the same logic trying to connect a feeling to a brand. The idea is to repeatedly create the same feeling when advertising a brand so that consumers will automatically connect a specific feeling to the brand. Therefore, consumers need to see an ad various times for conditioning to work (Genco, et al., 2013). The mere exposure effect further claims that being

exposed to a particular ad or brand without the consumer actively thinking about it, influences consumer preferences and behaviour (De Pelsmacker, et al., 2010).

2.2.4 How Advertising Works – A Framework

Having introduced two different approaches toward advertising, it has become clear that traditional ads focus on conveying arguments for products that the rational consumer can use to make a conscious decision. However, more recent scholars have shown that more emotionally involving ads, focusing on creating a bond between the brand and the consumer and thus addressing the intuitive decision-making system, are more effective (Mehta & Purvis, 2006). This is very much in line with Kahneman's argumentation. Since consumers have a large amount of options it is difficult to process all information rationally leading them to base decisions on their intuition and rules of thumb. These factors are therefore what advertisers should appeal to, while using emotions to do so.

Vakratsas and Ambler (1999) have discussed the previously introduced advertising models and generated a framework of how advertising works. Here they acknowledge that traditionally ads were seen as providing input and reason for consumers to buy or prefer a product. However, more recent literature shows that consumers form preferences based on feelings such as liking induced by the ad or familiarity triggered by mere exposure to the ad, rather than product- or brand attribute information. It can further be argued that cognition and affect are not necessarily alternatives or competing but rather very interactive (Morris, et al., 2005). The framework introduced by Vakratsas and Ambler (1999) offers a good overview of the previous discussion and can be seen below.

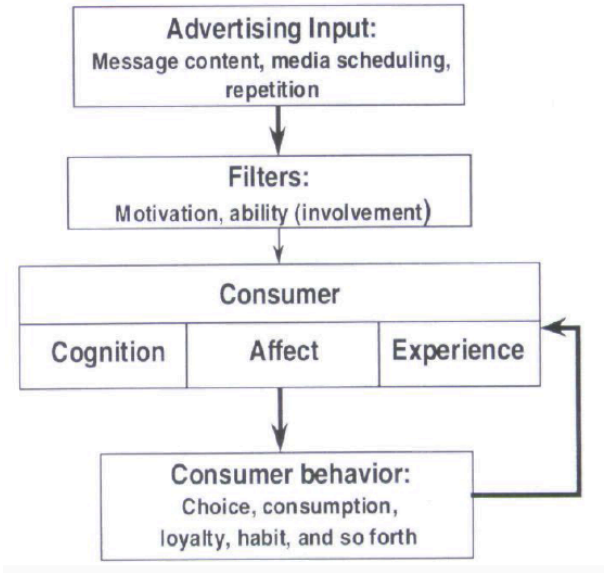


Figure 3: A Framework for Studying How advertising works

The first stage of the framework describes that consumers will be exposed to an advertising input. The different filters are reflecting on the previously discussed EML model where consumers will either follow the direct or indirect route. Then an either conscious or unconscious response will take place where consumers evaluate the ad either on a cognitive or affective level or on both which is followed by the behaviour effect. Logically, for many products consumers will already have conscious or unconscious memories shown as experience in the model. The purchase behaviour will consequently give feedback to the experience state forming or adapting existing memories (Vakratsas & Ambler, 1999).

The authors further acknowledge that the topic of emotions is relatively new and that the provided literature is therefore not extensive. At the time of the paper's publication, research specifically focusing on affect has been based on solely self-reported measurements, rather than neuroscience, which is debatable. The authors therefore propose that this should be corrected through studies where further cognition and affect are tested parallel and not in different studies (Vakratsas & Ambler, 1999), leading to much more conclusive and valid research.

2.2.5 Stop Measuring and the Ad will Stop Improving

The previous elaboration has shown that the advertising discussion is moving from a rational to an intuitive and emotional-driven approach. However, to conclude this chapter, it is not only necessary to better understand advertising, but current measurement tools being used to access advertising effectiveness also need to be discussed. Following, the three most popular ad effectiveness measurements; ad likeability, persuasion, and recall will therefore be introduced, since they are considered the three most important elements in testing ad effectiveness (Van Den Putte, 2009; Mehta & Purvis, 2006). Advancing on pure explanations, a discussion on the relevance of the concepts is added.

Bergkvist and Rossiter (2008) state that nowadays, **ad likeability** is one of the most common measures used to evaluate ad effectiveness, whereas Du Plessis (2005) argues that it the main predictor of advertising success. Here the underlying assumption is that when people like an ad they will pay more attention to it. Further the Advertising Research Foundation (2014) recommends likeability as the single best copy-test predictor of campaign success leading to 73% of advertisers and 53% of advertising agencies using this metrics. This view is also supported by Du Plessi (2005) who states that the strongest factor to predict ad success is how much an advertisement is liked. He

further supports the argumentation that liking leads to more attention and thereby better memory formation. He defines ad likeability based on six factors: Ads should be entertaining, include relevant news, and create empathy. However, they should not seem too familiar, be confusing, or be alienating. Still, the ad likeability approach is not unchallenged. Rossiter and Bergkvist (2008) show in their study that likeability failed to predict post campaign brand communication effects, which is why they recommend using brand-based measures. Examples are taking beliefs about a brand and attitude towards the brand into account. This especially holds true for testing ads for unknown brands, whereas for known brands prior brand attitudes need to be considered (Bergkvist & Rossister).

Within **persuasion** literature it is assumed that beliefs can be shaped. Here a message is provided to influence someone's behaviour (DellaVigna & Gentzkow, 2009). In advertising persuasion is then used to influence the purchase decision process implying that when a message proves to successfully persuade consumers will prefer and purchase a presented product (Danciu, 2014). The Elaboration Likelihood model also discusses persuasion and explains how the persuasion process differs under central and peripheral processing. Via the central route consumers form neutral, supporting, or counter arguments for a message, whereas via the indirect route not the ads message but simple, peripheral cues influence the outcome. Here, it is therefore assumed that in the direct route consumers consciously evaluate different arguments presented. As previously discussed, it can be argued that this process is unlikely to take place as consumers rarely use logical argumentation when choosing a product (Genco, et al., 2013). Consequently, it can be claimed that especially under the indirect route persuasion is not a useful metric.

Recall can be considered the oldest measure, trying to express a participant's memory of a shown ad. Studies have shown that up to 90 % of advertisers and ad agencies use recall as a measure to evaluate ads (Stewart, et al., 1985). Brown (1985) further states that ads that fail to gain high recall are disasters, whereas ads that achieve high recall are triumphs. Depending on which tools are used, both recall and recognition have regularly been tested (Stewart, et al., 1985). However, recall has been challenged as well. Critics say that recall is strongly influenced by non-advertising factors and that it is therefore difficult to draw valid conclusions (Stewart, et al., 1985). Nonetheless, it can be argued that recall is still one of the most relevant measures. It can be reasoned that all consumer choices are at least partially influenced by memory, which makes it crucial to measure it (Walvis, 2007). Further, as Gordon and Langmaid (1986) state everything that is done within market

research is based on memory. Therefore recall will always remain an important measure. Here, it should be noted that it is not necessarily what consumers consciously remember but also what can be retrieved from their unconscious behaviour. Hence for both the direct and the indirect route this measure is relevant. Moreover, it might be influenced by ad likeability as research supports the idea that the more people like an ad, the more they pay attention to it and thereby recall will be increased (Mehta & Purvis, 2006).

2.2.5.1 Traditional Measurement Methods

After having discussed what the most common goals are, a look at how the industry currently measures ad effectiveness is of interest. Here on the one hand, the above-defined goals will be traced, but on the other hand mediating factors such as attention and emotions are evaluated as well.

Not only has the previous discussion shown that the goals defined for successful advertising might be outdated, but current research also challenges existing knowledge about how advertising works. Unfortunately, the measures that are used to test ad effectiveness have in many cases stayed the same over decades (Health & Nairn, 2005). Looking at what leading market research companies such as Nielsen, MillwardBrown, and TNS are doing it can be concluded that they are at least still partly using traditional measures. However, many of the leading creative ad agencies are still using traditional methods, where the industry often assumes that sales effectiveness can be predicted through traditional surveys (McDuff, et al., 2013). Therefore the most common approaches will briefly be discussed.

Copy testing or pretesting of advertisements is used to predict advertising effectiveness; the technique is used to evaluate if an ad transfers a strong enough message (Market Research World, 2014). The focus is on the creative content of the execution (Percy & Rossiter, 1997), which is tested via experiments. Different outcomes can be tested. Percy and Rossister (1997) for example propose to test attention; here processing measures, acceptance, and learning are important. Further, communication effects should be measured where brand purchase intention, brand attitude and brand awareness should be focused on. Traditionally, the focus has been on measuring recall and persuasion. Recall is for instance measured with Burke's "Day After Recall" (DAR), and persuasion with ARS Persuasion predicting brand preference (Honomichl, 1986). However, already Krugmann (1977) proposed the theory that consumers will form knowledge without being able to recall it leading to so called non-verbal measures. Unfortunately, these measures have not frequently been adopted until recently. Different research companies such as Nielsen and

MillwardBrown state that they are using neuromarketing tools to pre-test advertising (millwardbrown, 2014; Nielsen, 2014). Later in this thesis, in section 3.2.1 some of these neuromarketing tools will be elaborated.

Surveys and questionnaires have always been a favoured method. They are a self-reporting measure where structured questionnaires are used to elicit answers in a controlled and generalizable way (Genco, et al., 2013). It relies on people's verbal self-report to identify their attitudes, preferences, and behaviours, and depend on people's memories to accurately recall what they have done, seen, or thought in the past (Health & Nairn, 2005).

One example of a survey technique is the thought-listing techniques introduced by Crimmins (1997). Here participants will be asked a variety of open-ended questions such as what kind of emotions, feelings, thoughts, and ideas they had when looking at the ad. The process will therefore gain insights in their deliberate, explicit, and self-conscious processing, but will not tab into implicit, non-deliberate, and unconscious processing (Crimmins, 1997).

A second approach that can be mentioned here is the cognitive response analysis. Based on the theory of cognitive processing this analysis assumes that consumers are not passive and objective when being exposed to an advertisement. They interact with the presented message, interpret, and argue with it. Therefore, the stronger the level of cognitive processing is the more likely the message will change the attitude or create an effect. Using this method, participants will be exposed to an advertisement and will afterwards be asked to write down their reactions and thoughts that went through their mind. It is further hypothesized that cognitive processing will not be a predictor of effects such as persuasiveness or likability, but is rather imprinting the effects (Lebenson & Blackston, 1997).

There are various different survey and questionnaire methods being used. However, it needs to be noticed that self-report measures assume that people have a conscious accessibility to their mental states. Nonetheless, a vast amount of research shows conclusively that people often either do not know or cannot explain why they do things nor can they state why they have certain attitudes or opinions. Their mental processes involving perception, evaluation, and motivation may never reach the level of conscious awareness (Genco, et al., 2013). Therefore, self-reporting measures may produce misleading results.

As the discussion has shown, most of the measures used today are still based on the direct route of advertising emphasizing what consumers consciously remember and what they state. However as already mentioned studies show that consumers cannot always express what they remember and feel as much of it takes place at an unconscious level. Therefore, the following chapters will introduce neuroscience, findings, and methods.

2.3 Neuromarketing: Insights of the Consumer's Mind

"*The aim of marketing is to know and understand the customer so well the product or service fits him and sells itself*"

Peter Drucker (2012)

Neuromarketing is a relatively new research field that sits at the intersection of least three basic science fields; neuroscience, behavioural economics, and social psychology (Genco, et al., 2013).

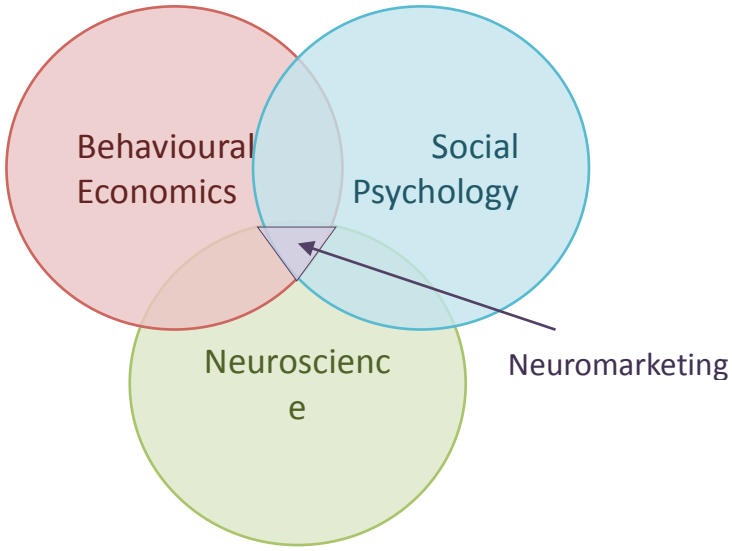


Figure 4: Neuromarketing at the intersection

As mentioned, research has gone from a rational consumer that calculates the effects of each option to an intuitive consumer that makes decisions relatively fast based on emotions and mostly without consciously evaluating information. Accordingly, traditional marketing measures such as surveys, interviews, and focus groups have been criticized and are often not considered to be valid. However, even though scholars, such as Genco (2014), do claim that while traditional marketing measures have their problems, they also reveal that in combination with neuroscience tools researches receive the best and most valid output (Genco, 2014). Neuromarketing offers a new set of methods and techniques to gain a better understanding of consumer behaviour. It borrows the

tools developed in neurosciences and applies them to marketing and consumer behaviour. As it is assumed that consumers cannot truly express why they make the choices they make, neuromarketing tries to better understand the underlying processes (Ramsøy, 2014). Therefore, neuromarketing can be used to gain a much more insightful result.

For this thesis it is especially important to understand the three concepts emotions, attention, and memory from a neurological perspective. Therefore in the following sections, these will be introduced and discussed in detail.

2.3.1 What is Memory?

"*Memory is the scribe of the soul*"

Aristotle (384 BC – 322 BC)

As Walvis (2007) notes almost all consumer choices are at least partially memory-based emphasising the importance of brand memory. Therefore, it is crucial to gain a better understanding of how memories are formed during ad exposure; different types of memory and its formation from a neurological perspective will be discussed first.

Generally, **memory** is the ability to encode, store, and recall information (Baars & Gage, 2013). The memories that are formed are stored throughout the brain rather than in any specific part of the brain. An important predictor of consumer preference is the consumer's memory of previous exposures to the brands, which is why it is important for influencing subsequent retrieval and recognition. There are different stages of memory depending on time, abstraction level, and processing level. These different types can be categorized from perception to three main stages, being (1) sensory memory, (2) short-term memory, and (3) long-term memory.

Sensory memory is the shortest element of memory with duration of milliseconds (Baars & Gage, 2013). It is the ability to retain impressions of sensory information after the original stimuli has ended. The role of sensory memory is to provide a detailed representation of our entire sensory experience for which relevant pieces of information can be extracted by short-term memory. **Short-term memory** (STM) is a working memory since it describes the ability to remember and process information at the same time and hold a small amount of information in mind in an active, readily-available state; typically seconds (Baars & Gage, 2013). Information from STM can then be consolidated into **long-term memory** (LTM) where memories are stored over a longer period of time. The general accepted representation of LTM is that it can be represented as a network of

nodes and connecting links; nodes representing stored information or concepts, and links representing the strength of association between nodes (Keller, 1987).

LTM can further be divided into explicit- and implicit memory. Traditionally, marketers have focused only on **explicit memories**, which are memories that can be clearly and definitively remembered. This kind of memory is assumed to operate in the direct route of advertising because it is tested by asking people what they can recall from particular experiences such as seeing an advertisement (Genco, et al., 2013). However, when advertisers first thought to test advertising effectiveness by asking consumers if they remembered seeing an ad they were unaware of the distinction between implicit- and explicit memory. Therefore, by only focusing on explicit memories they ignored potential effects of implicit memory.

Explicit memories can be further divided into episodic- and sematic memory. **Episodic memory** is where people store personal experiences with brands such as events they have been involved in at a specific time or place. **Semantic memory** is where people store accessible information about a brand such as its name, product attributes, and other concept-based knowledge (Ramsøy, 2014).

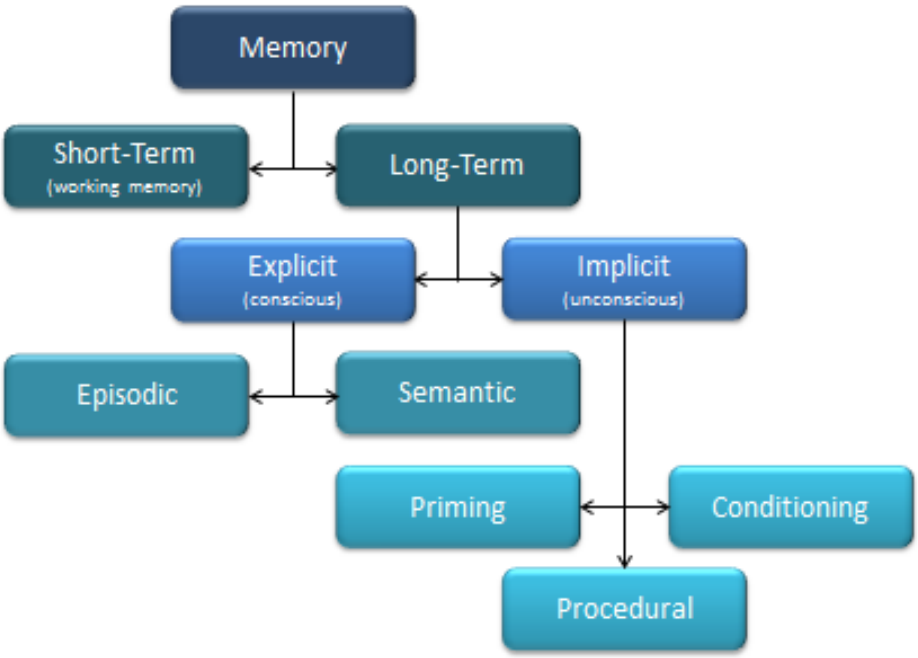


Figure 5: Types of Memory

Implicit memories are unconscious; nevertheless, they exist in the consumer's mind and can have a profound impact on how consumers feel about brands and what they choose to buy (Genco, et al.,

2013). They are generally thought to be acquired and stored in the amygdala (Baars & Gage, 2013). Implicit memories can also be further divided into priming, conditioning, and procedural memory. **Priming** is the implicit memory process by which one idea more easily comes to mind after exposure to another idea. Brands can either be primes themselves or be primed by other factors. **Conditioning** is a process of associating two things in memory by repeatedly presenting them together. Much of brand advertising is an exercise in conditioning matching particular attributes with the brand. Procedural memory has to do with learned skills. Although brands are generally not associated with the acquisition or use of such skills they can become a part of a person's perception of a skill as when one brand of sports equipment is believed to be superior to another (De Pelsmacker, et al., 2010).

Summarizing brand memory, it can be said that from the neuromarketing perspective a brand is a network of associations stored in LTM. As the process of associations is made and unfolded the brand memory is shaped and reshaped. As it expands and diversifies, the meaning of the brand changes and diversifies, too. The brand can be thought of as a node in this network linked to a variety of other nodes, which make up the brand associations (Du Plessis, 2005). This process takes place naturally in our minds. In turn, brand marketers want to influence the process by creating exposures that are meant to connect the brand memory with particular values, emotions, capabilities and so forth, why brand awareness is critical (Genco, et al., 2013).

2.3.1.1 Effects of Cognitive Load on Memory

As previously mentioned, the brains capacity to process information is limited (Kolfschoten & Brazier, 2012); therefore it is important to briefly clarify the concept of cognitive load. As described by Sweller (1998) cognitive load refers to the total amount of mental effort being used in the working memory, and therefore the cognitive effort by a person to perform a task. The given concept is relevant to this paper; since studies have shown that a heavy cognitive load can have a negative effect on task completion (Frein, et al., 2013). Different degrees of cognitive load might therefore also affect the process influencing memory formation. To measure this, recent studies have demonstrated that the frontal theta is closely linked to cognitive load (Jensen & Tesche, 2002), why one measurement of cognitive load is found by using the EEG.

2.3.1.2 The Brand-Linkage of Memories and Advertising

For this thesis it is important to understand brand memory in terms of advertising. Only if advertising is able to create or strengthened brand memory it is considered successful (Steidl, 2014).

Du Plessis (2005) describes different aspects that influence brand memory. First, branding within the ad should be mentioned. If the brand is shown in the beginning of the ad, the entire ad will support brand memory. At the same time if the stimulus is only shown in the end of an ad, brand memory stimulation is decreased. Second, Du Plessi (2005) notes that the length of an ad plays a vital role and needs to be optimized in order to support brand memory formation. Moreover, a third issue first introduced by Walker and von Gonten (1989) is brand linkage, which is concerned with the degree to which consumers are able to connect the right brand to a given advertising. It is important that an ad creates relevant associations stored in memory. These associations should then either be linked to the brand or strengthen existing brand memories. Van Kuilenburg (2011) provides a relevant example; just as in the previous discussed Evian ad it has been shown that advertising often uses humour to make it more enjoyable. However, this often results in consumers remembering a great ad, but not the advertised brand. Therefore, it is proposed that the joke being used needs to be connected to the brand. A last concern is interference (Crowder, 1976; McGeoch, 1942; Melton & Irwin, 1940; Postman & Underwood, 1973). It describes that either memory formation is not taking place or even forgetting might be reinforced because memories interfere with and disrupt one another (Baddeley, 2006). Therefore, too much input could disturb memory formation. The cues available for brand decisions, such as brand name, may not effectively retrieve the information, thoughts, or feelings stored in memory from prior ad exposure (Keller, 1987). For instance, the more brands advertise with strong emotional ad content, the more it could result in unconnected ad memory traces such that consumers find it more difficult to remember which brand the ad is associated with.

The literature review did not provide good input concerning the above described problems. However, Millward Brown (2005) has come close with their “creative magnifier”. This model addresses and summarizes the described problems. The basic assumption is that customers’ memory of an ad is not equal for every second of it. People remember the enjoyable and engaging moments better than others. Therefore, using a strong creative device bears the dangers of not being linked to the brand, thereby supporting ad but not brand memory. Millward Brown (2005) state that if the ad

does not succeed in linking the ad to the brand, the ad will be inefficient, therefore it is important to ensure that customers pay attention to the right thing in order to create brand memory.

Overall, one of the consistent findings from the above studies is that remembering an ad is useless without brand memory. As mentioned before, the brain's conscious work space is limited (millwardbrown, 2014) why only factors that are emotionally charged and relevant to the consumer is stored, whilst other aspects are ignored and don't make it to the brain's conscious attention, and gets forgotten. To conclude, it is essential that the right content is noticed since ad memory without brand memory is useless whilst brand memory, even without ad memory, is effective (Hollis, 2013).

2.3.2 What are Emotions and Feelings?

If there is one topic that the marketing industry is concerned with, it is what drives consumer choices. Current research shows that emotions and feelings are key concepts in consumer psychology and in marketing, emphasizing the idea that emotions play a vital role of how consumers form decisions. Most accounts of consumer psychology conflate the terms of emotion and feelings; neuroscience has promoted quite distinct definitions of the terms. As described by Damasio (1999) emotions are changes in body and brain states. On the contrary feelings are defined as a person's experience of being in a certain emotional state, which is associated with consciousness and is always introspective (Ramsøy, 2014). Feelings are therefore always related to some sort of emotional response where emotions can be a lot more than just feelings. Emotions can be both conscious and unconscious where feelings are based on consciousness. Feelings are therefore usually measured via self-reports.

Ramsøy (2014) defines emotions as a person's expression of an inner bodily state; a bodily response to an event with a mechanical, stimulus-response basis, and typically without or before awareness. Research suggests that there are two dimensions or emotions pertaining strength and direction of emotional response, called arousal and valence (Olofsson, et al., 2008; Kousta, et al., 2009; Nasrallah, et al., 2009; Kron, et al., 2013; Hamann, 2012; Bradley, et al., 2008). Furthermore motivation is often added as a third dimension (Ramsøy, 2014). **Arousal** describes the bodily responses of general excitement to "relevant" cues, ranging from low to high. These bodily responses can be recognised via certain brain activity, increased pulse and respiration, dryness of mouth, sweating in palms, or mental blocking (Ramsøy, 2014). These responses have played a vital function in the evolutionary past, allowing the brain to engage bodily functions that can improve

ability to respond to the situation at hand. However, arousal measures have a drawback because they are bivalent, meaning that arousal can be high for both positive and negative events. This situation leads to an inference problem, suggesting that arousal indicates the amplitude and strength of an emotional response, but not the direction. The arousal response can in many ways be seen as a relevancy response; the stronger the change in arousal, the more relevant it is (Groeppel-Klein, 2005). In section 6.1.2. inference issues concerning this study will be further discussed.

The second emotional dimension, **valence**, on the other hand describes the direction of the response. Here, emotional valence is a measure of whether stimulus is evaluated as positive, neutral, or negative. This evaluation covers the spectrum from strong negative fear responses to extreme positive experiences of euphoria. As with arousal, valence is one-dimensional and can only point to the direction of an emotion. What it does not demonstrate is the amplitude of this emotion. However, arousal and valence are not completely orthogonal, but do display a systematic relationship (Kron, et al., 2013; Hamann, 2012). Crucially, all emotions must be ranked according to both dimensions, and knowing only one dimension would be insufficient to understand people's emotional responses.

Moreover, as a part of emotions and feelings, the topic of what drives choices and preferences is found to be vital. Ranging from self-reflections and narratives about desires and motives, to the unconscious drivers of choices, **motivation** is seen as one of the most important concepts in consumer psychology and in marketing. The brain's evaluation system is driven by the simple rule of maximise reward, minimise pain (source). However, this does not mean that consumers are always driven by immediate results. Rewards and pains are rather concepts that have at least two dimensions; occurring either immediately, or delayed (Ramsøy, 2014). An instant reward might be a consumer's urge to buy a pair of beautiful shoes, but over time the consumer also sees the delayed reward of saving money. On the other hand, the instant pain of an intense training session can be instead of the delayed pain of not being healthy. Interestingly, emotions and feelings are connected in complex ways to this division. While on the one hand, emotions are tightly connected to the early reward and pain operations associated with instant judgments, feelings seem to be connected to both the instant feelings of reward and dread, as well as the thinking about delayed outcomes (Ramsøy, 2014). Motivation does indeed have two distinct systems in the brain that operate in parallel, and sometimes in conflict. Choices are not driven by a single, linear, and consciously controlled system, but rather based on two processes; "liking" and "wanting" (Berridge, 1996).

Liking is a person's hedonic experience, and therefore a hedonic impact. Liking is thereby also a critical aspect of award and is accessed through explicit preference statements. Researchers have found that even unconscious or implicit liking reactions to hedonic stimuli can be measured in behaviour or physiology without conscious feelings of pleasure (Winkielman, et al., 2005; Fischman & Foltin, 1992). Thus, though perhaps surprising, objective measures of liking reactions to rewards may sometimes provide more direct access to hedonic systems than subjective reports (Berridge, et al., 2009). Usually a brain likes the reward that it wants. However, research has found that liking and wanting rewards are two different motivational phenomena (Knutson, et al., 2007). Whereas liking is driven by humans' opioid system, **wanting** is driven by dopamine. Wanting is a type of incentive motivation that promotes approach toward and consumption of rewards and which has distinct psychological and neurobiological features (Berridge, et al., 2009). Since wanting is an unconscious state, and could therefore be measured via neuroimaging, behavioural change of approach versus avoidance, and higher arousal to rewards and punishments (Ramsøy, 2014).

Bringing together, the three important emotions valence, arousal, and motivation the following can be discussed. As noted, arousal is bivalent whereas valence and motivation have the advantage of being able to tell the positive and negative direction of the emotion. However, they lack the ability to show the strength of a response. When these scales are gathered an interesting phenomenon appears, producing a model of the relationship between arousal and motivation. For the extreme motivation scores, arousal is high but for relatively neutral motivation scores, arousal is lower. This is illustrated in the Arousal-Motivation Matrix (Ramsøy, 2014):

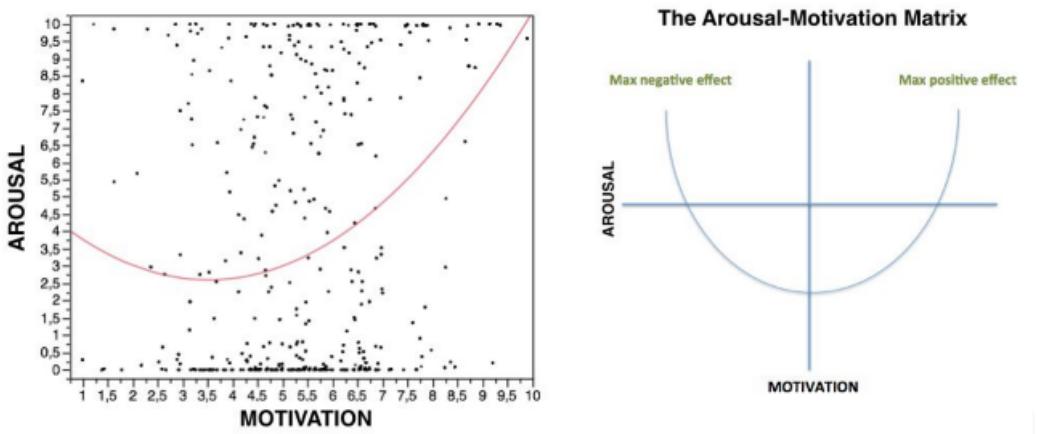


Figure 6: The Arousal-Motivation Matrix (Ramsøy, 2014)

In most neuroscience studies, the typical relationship between arousal and motivation looks like the left graph, measured with an EEG. It is nonlinear, testing the neutral to positive aspect of consumer responses. The right graph shows the principal function; a more balanced model of how the results would look like if one would test effects of highly aversive events. Nevertheless, it can still be seen that the most intense motivational responses are related to the highest arousal scores compared to neutral motivation that produce the lowest arousal scores (Ramsøy, 2014).

2.3.2.1 Emotional Marketing – Improving Memory Formation

It has been shown that emotions are crucial for successful marketing and that emotional content is better remembered (Mehta & Purvis, 2006). Many brands benefit from associations with positive emotions. However, the fact that most successful brands tend to have a balanced set of associations and rational strengths should not be ignored (Millward Brown, 2009). Advertising that generates a strong emotional response has two benefits. Firstly, it can help to transfer emotions to the brand shaping brand perceptions. Secondly, it can help generate engagement and memorability. Commonly, advertising tries to connect positive feelings to a brand to ultimately result in a positive emotional takeout (Millward Brown, 2009).

At the same time advertising can also generate negative emotions (De Pelsmacker, et al., 2010) caused by different factors. The media channel can cause irritations since consumers get annoyed when they are being interrupted by TV commercials or pop-up ads online. Ad content itself can be disturbing; where consumers get irritated with exaggerations, unsympathetic characters, or hard selling facts. Further, seeing an ad too often can irritate. However, it should be kept in mind that consumers are different in the way that some generally do not like ads while others enjoy watching them (De Pelsmacker, et al., 2010). Research so far has been inconclusive whether negative feelings will always result in negative brand attitudes. The law of extremes assumes that a negative attitude toward the ad can lead to positive brand attitude, while ads that only evoke a moderate attitude will lead to a negative brand attitude (De Pelsmacker, et al.). Furthermore, it might also depend on consumer motives whether they consider feelings toward an ad relevant or not when forming brand attitudes.

2.3.3 What is Attention?

Attention is the third important concept after having discussed both memories and emotions. This section will therefore give a more detailed discussion on what attention is from a neurological perspective.

Attention is the behavioural and cognitive process of selectively concentrating on one aspect while ignoring others (Baars & Gage, 2013). When consumers focus on something specific it is at the cost of something else. Thus, one can say that it is rare resource that marketers have to carefully use. Looking at different definitions it quickly becomes evident that attention is not equal to attention. Four distinctions should be made; high- and low attention and top-down and bottom-up attention (Heath, 2001). They will respectively be discussed.

High attention is a state of alertness in which a person is actively and voluntarily focusing and maintaining its attention on a particular object, whereas **low attention** involves much less active mental control. It consists of passively monitoring objects and events in the person's environment often without much awareness of doing so. Hence, when one pays high attention to a specific thing at a time, the person might pay low attention to other things in the surrounding (Genco, et al., 2013). Only when something happens in the surroundings low attention might be escalated up to high attention, such as hearing their name spoken in a crowded room (Heath, 2001).

High attention and low attention are related to, but different from, the concepts of top-down and bottom-up attention. While **top-down attention** actively focuses and selects to focus on certain aspects, **bottom-up attention** is automatic, unconscious, and driven by external cues. Both types are mechanisms by which consumers can be brought to a state of high attention (Ramsøy, 2014).

As the discussion has shown, there are different types of attention all dynamically interacting with each other. Even though top-down attention controls what to focus on, bottom-up attention can allow a salient stimulus to become the attended object. Additionally, top-down attention can force itself on bottom-up attention but not in the same way since top-down attention relies on selectively activating and inhibiting selected processes in the sensory system.

2.3.3.1 How Advertisements grab Attention

Attention is very relevant for advertising. As the literature review above has shown, many of the traditional marketing models are based on and require attention.

As described in the direct route high attention has traditionally been assumed to be necessary for advertising to be effective. This is for example shown in the high attention-processing model of advertising effectiveness (Genco, et al., 2013). This model emphasizes the value of attention as an element of advertising effectiveness; the more people pay attention to an ad, the more likely they are to remember it and the more effective it's considered to be. However, viewers are seldom engaged in high attention when they see ads in a natural setting. Instead, most of the attention devoted to advertising is now understood as low attention, the foundation of the indirect route.

The idea of low attention also being effective for advertising was first introduced by Krugman (1965) and was further pursued in various research studies and models such as the low attention-processing model of effectiveness (Heath, 2012; Shapiro, et al., 1997; Health & Nairn, 2005). This approach argues that attention is actually detrimental for advertising to some degree and for some purposes such as brand building, because the more people pay attention to an advertisement, the more likely they are to create counterarguments to the persuasive messaging in the advertisement and, therefore, develop resistance to the message (De Pelsmacker, et al., 2010). According to this view, successful ads do not work because they grab attention and persuade logically, but because they generate positive emotional responses that get associated with the brand or product through simple repetition. High attention to the advertising itself does not help this process and may actually obstruct it. Correspondingly, low attention combined with positive emotional associations is seen as preferable. Furthermore, instead of relying on explicit persuasion low attention relies on priming and reoccurring conditioning. Instead of aiming at creating explicit memories it is emphasized that under low-attention the creation of implicit memories will take place. Further sensory associations might be formed and will be particularly strong (Health & Nairn, 2005). Pringle and Field (2009) have shown that even though effects on attitude change are stronger under high-attention, there is still a considerable impact when consumers are unconsciously paying attention to an ad.

Based on neuroscience studies there is fair evidence that people do implicitly resist persuasive messages (Genco, et al., 2013). However, it is also possible to argue that when consumers enjoy an ad, they pay more attention thereby making the ad effective. Consumers' attention gets directed to interesting and enjoyable aspects of the advertisement being the emotionally charged and relevant

factors distracting the consumer's attention from other elements. Therefore, for this research, attention is considered as a valuable and supportive factor of advertising and respectively brand memory formation.

2.3.3.2 The Relationship between Emotions and Attention

After having discussed the concepts of emotions and attention it is also important to understand how the two interact and influence each other. Emotions are a reliable measurement indicator for attention. In a visual field of many objects the one that is most emotionally relevant is likely to pull people's attention toward it. Thus, if a marketer successfully links strong emotions to his brand, the brand can trigger attention toward itself. Looking at the three dimensions of emotions being arousal, motivation, and valence, motivation influences unconscious emotional reactions where people often direct attention toward aspects of their environment that can help them achieve their goals. Conversely, objects or information sources that fail to generate an emotional reaction are more likely to be ignored and forgotten (Genco, et al., 2013). Emotional valence tends to draw people's attention to the familiar and the easy to process. This familiarity furthermore induces liking, liking draws attention, and attention increases the sense of familiarity. Therefore, people become more comfortable with a subset of things that satisfy needs, even though there may be many other alternatives that do the job just as well (Ramsøy, 2014). Emotional arousal has an interesting relationship to attention. Like increasing valence, increasing arousal attracts attention, but also narrows it (Libkuman, 1999). As people become more emotionally aroused they become better at filtering out distractions and focusing more intensely on a specific object of attention. However, this only works to some degree. If arousal gets too high, attention begins to deteriorate and focus becomes more difficult (Genco, et al., 2013).

2.3.3.3 Attention as a Gateway to Memory

Memory and attention have traditionally been viewed as distinct processes and have been studied independently. However, many researchers state that attention is a gateway to memory in that attended stimuli are better remembered than those that are not the focus of attention. Selective attention is necessary to restrict the contents of capacity-limited memory by limiting interference from irrelevant information (Gazzaley Lab, 2014). By serving as a neutral basis for selective attention, top-down attention influences our effectiveness in maintaining information in mind for brief periods of time as well as consolidating information for later recall or recognition. Thus, top-

down attention serves as a foundation for diverse cognitive processes, such as attention, working memory and long-term memory (Baars & Gage, 2013).

2.4 Remember the Ad? But What about the Brand!

"*Some brand owners overlook the branding element and instead just focus on the enjoyment aspect*"

Gervaise Slowey (2005)

After having discussed the most relevant marketing models and neuromarketing aspects, these will be combined to derivate the research focus of this thesis.

The key takeaway when looking at branding and advertising theories is that brand awareness and brand attitudes need to be formed to create strong brand equity. Since consumers usually do not make brand purchase decisions when being exposed to advertising, it is unlikely that ads will directly influence sales (Mehta & Purvis, 2006). Further, research has shown that purchase behaviour is much more driven by the unconscious mind. Consumers strongly rely on decision shortcuts eliminating the need for rational thinking. Thus, strong, unique, and favourable memories need to be formed that will easily be retrieved during or before the purchase decision (Steidl, 2014).

Hence, it is the memory that consumers form of the advertised brand that will influence purchase behaviour (Mehta & Purvis, 2006). As discussed above, the concepts of brand awareness and brand attitude are combined and measured via brand memory in this paper. It seems reasonable to argue that marketing efforts should be focused on developing a positive, emotionally strong brand memory.

Both neuroscience and marketing theories have argued that attention and emotions are key components for creating strong brand memory. For instance, Pringle and Field (2009) demonstrate that campaigns with purely emotional content performed about twice as well than ads with only rational content. Additionally, those that were purely emotional did a little better than those that mixed emotional and rational content. However, among marketers there is no agreement on how exactly emotions influence advertising efforts and how they can be evaluated or measured (Mehta & Purvis, 2006). Moreover, attention is also a controversial subject. Genco (2014) mentions that an understanding of how and when to modulate attention is needed since too much attention can also be destructive. Here, it is important to point out that the two concepts are also highly interlinked, as

recent research suggests emotions are a key driver of attention rather than cognitive or rational responses (Mehta & Purvis, 2006).

Based on these research insights many marketers have therefore focused on creating emotional and attention grabbing ads (Morphy, 2014). Often it seems that the main purpose of these ads is to be entertaining where humour or sexual inputs are used as means to attention. There are various examples of campaigns that managed to engage a large number of consumers but that did not succeed in impacting purchase decisions (Steidl, 2014; Walker & von Gonten, 1989). An example of this is the previously discussed ad of Evian, which created one of the most viral ads with babies dancing and roller-skating, but simultaneously experienced decreasing sales (O'Leary, 2010). An argument can therefore be made that these ads create strong ad memory where the ad content however steals away attention from the brand, thereby negatively impacting the creation of brand memory. This idea has been summarized in the creative magnifier introduced by Millward Brown (2005) emphasising that the most entertaining and engaging moments of an ad will be remembered and that these moments therefore need to be linked to the brand. Thus one can argue that campaigns that fail to create this link are not beneficial. As it is difficult to access memory formation solely based on traditional research methods, neuroscience can be of great help. In this way the marketer can clarify whether sequences that include the brand or the product or the logo gets trigger emotions that will ensure brand memory formation.

To gain a better understanding of how brand memory can successfully be created by bringing together different concepts such as emotions in advertising and brand memory formation, the following research question was created:

How do ad-induced emotions affect the viewer's memory formation towards the ad and the advertised brand?

Part 3: Methodology & Research Design

After an extensive literature review and the formation of the research question, the following chapter will discuss the chosen methodology and research design. Business research has often been criticized for having lost touch with concerns and interests of practitioners (Bell & Bryman, 2011). However, it can be argued that especially the research field of neuromarketing can benefit advertising agencies and marketing managers in improving their testing activities.

3.1 Philosophy of Science

Conducting business research, the methodical considerations will be discussed briefly.

The research is based on the research question deducted from the theoretical overview of the relevant theories. Here "*the researcher, on the basis of what is known about a particular domain and of theoretical considerations in relation to that domain, deduces a hypothesis that must then be subjected to empirical scrutiny*" (Bell & Bryman, 2011, p. 11). Furthermore, a positivistic position, which uses methods of the natural science to study social reality, has been taken. Among other characteristics this position believes that only phenomena that are confirmable by senses can be accepted as knowledge. This position furthermore states that theories should be used to generate hypotheses and that research needs to be conducted in a value-free way (Bell & Bryman, 2011). Concerning ontological considerations an objectivistic approach has been used. Objectivism claims that social phenomena such as organizations or cultures are independent from their actors, having an objective reality (Bell & Bryman, 2011).

As previously discussed the overall goal of this thesis is to gain a better understanding of brand memory formation in order to improve branding activities. As Walvis (2007) states; branding is usually considered a soft-science using qualitative measures to understand consumer behaviour and their preference of one brand over another. At the same time to better understand the process of memory formation one actually moves into neuroscience, which according to Walvis (2007) can be considered a "hard" science generating general, robust findings. Accordingly, an overall quantitative approach has been chosen to generate more objective results that can then be applied to branding activities. At the same time, a questionnaire with open-ended questions has been included as part of the research. This can partly be considered qualitative data and has been used to gain a better understanding of the collected data and its context (Bryman & Bell, 2011).

3.2 Research Method

Overall, the goal of this research is to provide an experiential test of brand memory to create a better understanding of memory formation within advertising.

To create this comprehensive perspective the exploratory research approach is taken (Bryman & Bell, 2011). This is due to the authors observing different factors of brand memory in relation to the emotional response and attention towards an advertisement. This exploratory research will then lay the initial groundwork for future research. The authors of this paper seek to create a better understanding of emotional effects on memory by conducting an experiment. Behavioural, physiological and neurological measurement methods are therefore employed during this research to get a more comprehensive perspective; behavioural attitude in terms of measuring facial expressions; physiological by measuring facial expressions; neurological measuring brain activity and arousal level responses to the presented stimuli. The physiological method consists of electroencephalography (EEG) operated in the Decision Neuroscience Research Group (DNRG) Senselab at Copenhagen Business School (Department of Marketing, 2014). All tools were integrated with the "iMotions Attention tool" (iMotions Global, 2014) and will be further explained in the following section. After the initial experiment, testing recall and recognition via a survey performed after the experiment will support results. A more detailed description of the entire experiment will be given later on.

3.2.1 Neuromarketing Tools

The neuromarketing research tools and techniques can be divided into two categories; approaches that measure body responses to advertising, and approaches that measure brain responses (Genco, et al., 2013). The physiological measures based on body signals, which have been used during the experiment consist of facial coding and a neurological measure the EEG. The methods will briefly be discussed.

3.2.1.1 Electroencephalography

The EEG is probably the most popular neuromarketing technology because of its relatively low cost and manageable equipment requirements (Genco, et al., 2013). It is an inferential measurement of brain activity using electrodes applied to the scalp and measures changes in the electrical field in the brain region underneath. Its advantage is that it has a high temporal resolution and can therefore detect brief neuronal events. Additionally, it's a well-established technology that benefits from a big amount of academic literature (Ariely & Berns, 2010; Plassmann, et al., 2012).

Emotional responses elicited by participants can be measured by using the EEG. In terms of this study the focus lies on measuring effects of motivation and arousal. This decision is based on the prior literature review demonstrating that arousal has strong effects on memory formation (Bradley, et al., 1992; Ramsøy, 2014). However, as arousal is bivalent it is useful to also measure motivation in order to receive a better indication of whether emotions are positive or negative. Moreover, it is also interesting to investigate how motivation affects memory.

However, because the skull disperses the electrical field, the EEG is limited to surface or near-surface readings. The EEG is also limited by the high resistivity of the skull, which makes the identification of the generators difficult (Ariely & Berns, 2010). At the same time it should be mentioned that the EGG provides insides that are not possible to be collected via self-reported measures as it tracks unconscious reactions that participants cannot report themselves.

3.2.1.2 Facial Coding

Facial coding measures emotions that are communicated via facial language (Ekman & Friesen, 1978). Here the basic assumption is that facial expressions serve to communicate emotions to both self and others (Teixeira, et al., 2012). Moreover, research supports the idea that there are distinct and cross-culturally universal facial expressions for the emotions such as joy, surprise, sadness, disgust, anger, and fear, among others (Ekman, et al., 1971). Further, they have been found to be robust indicators of positive or negative emotional responses called emotional valence, why more and more studies are conducted with the use of this measurement (Ramsøy, 2014). Using facial coding is thereby being perceived as superior to self-reported measures, as those are more difficult to assess continuously and have often shown problems of accuracy (Genco, et al., 2013).

Facial expressions can be read at two levels; observable changes in expressions, such as smiles or frowns, and unobservable changes in expressions, for instance contractions of muscles associated with positive and negative emotional reactions. During this experiment the iMotions tool (2014) was used. This programme detects and analyses the emotions of subjects in real-time. The solution processes the primary emotions identified by Ekman (1978) including joy, sadness, surprise, anger, fear, disgust, and contempt. The system also detects rapid subtle micro expressions as well as overall positive and negative sentiment. The picture below is an illustration of subjects from the experiment with different sentiments. The first subject is positive, the second neutral, and the third negative.

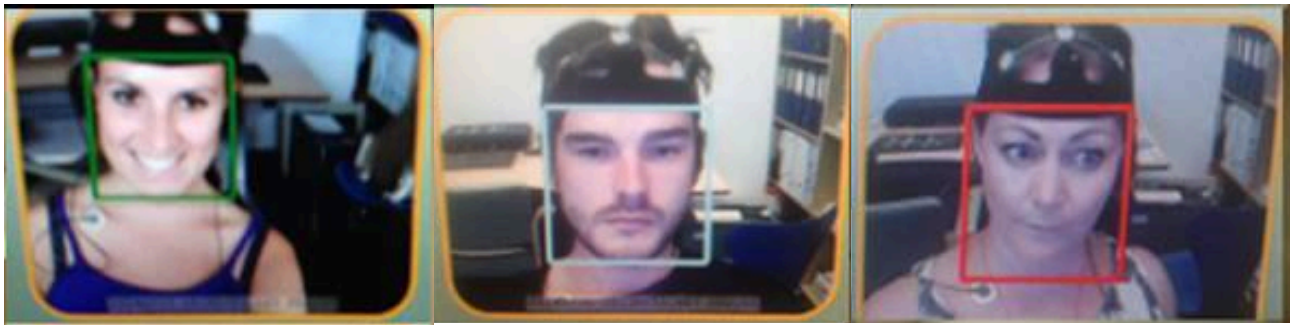


Figure 7: Facial Coding

3.2.1.3 The NeuroEquity Battery

According to Ramsøy (2014) "The NeuroEquity Battery" test can be applied to address the different aspects of brand memory. This test covers aspects such as memory strength, richness, and emotional content, and is subdivided into five subtests:

1. Top-Of-Mind: This section of the test relies on free recall of any brand, advertisement, or product shown.
2. Category cued recall: This section is based on so-called assisted recall with help from categories. The ad memory trace consists of stored ad effects, i.e., what the consumer learned, felt, heard, or saw during ad exposure. Thus, the purpose of these cues is to assist consumers' retrieval of elements of the ad memory trace.
3. Recognition: Here participants were shown the brand names, -logos, and/or screenshots of advertisements and ask whether people recognize the brand. This is often a very simple task, and most people tend to recognize brands when shown.
4. Subjective knowledge: A rating of how well a person knows a particular brand.
5. Associative density: In this section, the participants have to list all kinds of associations, feelings, thoughts, and impressions they have to each brand and/or advertisement.

By joining each of the above scores, one will have a total score for each brand. There are multiple alternatives to do this rating, as one might weigh top-of-mind scores higher than other scores. However, Ramsøy's (2014) NeuroEquity Battery solely provides the skeleton with which memory can be addressed in a more detailed manner.

3.2.2 Ethics of Neuromarketing

After having introduced the chosen research method it should be noted that neuromarketing, being an emerging field, has not been without critic (Ariely & Berns, 2010). Supporters of neuromarketing and its tools mainly hope for two things; first, since it is believed that consumers cannot fully articulate preferences and motivations when being asked to explicitly state them it can be useful to practice neuromarketing to uncover hidden information. Second, it is expected that by implementing neuromarketing tools, marketing research will improve tremendously. Not only will advertising be improved, but also product development can benefit from new insights, decreasing the number of failed product launches (Ariely & Berns, 2010). On the other hand, it is certainly understandable that concerns are being raised about the use of neuromarketing tools (Senior & Lee, 2008). Critics fear that marketers will take advantage of these tools in order to manipulate consumers to buy products they actually do not want (Genco, et al., 2013). Here, it is often referred to a buy bottom in the consumer's brains. Moreover, Ramsøy (2014) summarizes three main concerns. First, neuromarketing will make communication too effective, where consumers are either harmed, and exploited by research or consumers' autonomy is lost. Second, consumer privacy is comprised, which is concerned with consumers awareness, consent and understanding. And last, overselling and underdelivering, which is relating to the use and presentation of findings.

However, in the same line it can be argued that neuromarketing is mostly used to answer the same questions that marketers have long been trying to answer (Senior & Lee, 2008). Further, it should be noted, that advertising cannot trigger or prime purchases that consumers do not want – it can only trigger something that consumers already approach positively (Genco, et al., 2013). It is also expected that marketers will rather use newly generated knowledge to improve products in ways that benefit the consumer and identify new goods that consumers find useful (Ariely & Berns, 2010).

This study uses a research perspective where neuromarketing is used to obtain consumer knowledge that consumer or focus groups cannot articulate because of emotional reactions mainly happen unconsciously. Thereby, generated knowledge is being used to improve advertising initiatives, an undertaking that marketing research has been working on for decades. The stated ethical concerns have been taken into consideration and suspended as much as possible. Challenges are met by firstly using a code of ethics, to ensure beneficent and non-harmful use of the technology. Moreover, participants have been informed about the purpose of the study and poor data pre-

processing and analysis as well as misrepresentation or over-interpretation of results were addressed by taking "reverse inference" into concern (Ramsøy, 2014).

3.3 Definition of Variables

In order to conduct the research, relevant variables used for the analysis are defined and presented in the following section. This is to give the reader a better understanding of the scores given as well as increase transparency. The factors in the below table will be discussed in depth in the sections following.

Term	Measurement	Explanation
Brand Memory	**Based on Questionnaire:** Top-Of-Mind Associations (TOM) Category Cued Associations (CCA) Brand Recognition	The three measurements have been combined to create one Brand Memory Score (BMS). See 4.1.1
Ad Memory	**Based on Questionnaire:** Top-Of-Mind Associations (TOM) Category Cued Associations (CCA) Certainty seeing the ad	The three measurements have been combined to create one Ad Memory score. See 4.1.1
Emotional response	**EEG:** Arousal Motivation	Emotional responses are measured to see if branded elements have an effect on participants
	Facial Coding	Facial expressions are measured in order to see how they impact brand and ad memory. Here, a focus was laid on positive and negative facial expressions.

3.3.1 The Memory Index Score

This section will briefly explain how the authors rated the different memory scores. The most important aspect during this is the distinction between ad memory and brand memory.

As mentioned, participants filled out a questionnaire where the sections included a free recall task, a cued recall task, and lastly, recognition of the different ads. These three components have been taken into consideration to evaluate the strength of brand- and ad memory. To do so, a categorization of the number of free recall and cued associations into respectively brand memory and ad memory has been performed. Brand memory included when participants mentioned the brand name or described the brand logo. Here, also spelling mistakes of the brand name were included. Additionally, ad memory categorization was considered when participants described the content of the ad or the product. Since this scoring must be done partly subjectively, objectivity is increased by rating consistently throughout the study.

To further rate the categorization free recall is considered as the strongest form for memory followed by cued recall and then recognition (Ramsøy, 2014). To demonstrate these levels of importance the number of top-of-mind (TOM) associations has been multiple by three and the category cued (CC) associations by two, and the third variable with 1 for both the brand- and ad memory score.

Additionally, the rating scale that has been used is based on the ad that received the highest number of associations. For instance, based on the brand memory score, the brand with the most TOM memories had 30 associations, why the TOM scale is from 0-30, and for CC the highest number of associations has been 50 therefore creating a scale from 0-50. The third variable for the brand memory score is brand recognition (BR). Here, the correct answers were rated with one point, and the wrong with zero. The chosen scale for BR is therefore from 0-103; the maximum of 103 being the number of accepted participants. For the ad memory score the third variable is based on the rating of certainty seeing the ad. Here, the participants could rate from 0-10 how certain they were seeing the ad during the experiment, where 0 is definitely hasn't seen the ad, and 10 is definitely have seen the ad. The scale was therefore from 0-1030, since there were 103 participants and the highest rating was 10.

Each ad's number of associations was then multiplied by the level of importance and added up. This total score was divided by 293, being the overall maximum score possible. Lastly, this score was multiplied by 100 resulting in a cleaner overall brand memory index score being easier not only for the eye but also for evaluation.

Recall Level	Priority	Scale	Index
Brand Memory Score			
Top-Of-Mind Associations (TOM)	3	0 – 30	0 – 100
Category Cued Associations (CCA)	2	0 – 50	0 – 100
Brand Recognition	1	0 – 103	0 – 100
Brand Memory Scale		**0 – 293**	**0 – 100**
Recall Level	Priority	Scale	Index
Ad Memory Score			
Top-Of-Mind Associations (TOM)	3	0 – 50	0 – 100
Category Cued Associations (CCA)	2	0 – 55	0 – 100
Certainty seeing the ad	1	0 – 1030	0 – 100
Ad Memory Scale		**0 – 1135**	**0 – 100**

Table 1: Memory Score Index

A more comprehensive view of the memory index score is shown in appendix 11.2.

3.4 Definition of Hypotheses

The aim of this study has been to investigate how ad-induced emotions affect memory formation of the advertisement and respectively the advertised brand, and whether these two correlate. The research question was inspired by the well-known Evian ad where from the previous discussion one can derive different observations; even though the ad was celebrated as highly creative the company suffered from market share loss in the same period. The fact that an ad that consumers truly enjoyed, but does not positively impacts sales led the authors to speculate the relation between ad-induced emotional responses and memory formation.

To tackle the issue, and based on the prior findings, the authors of this paper assume that emotions will have effect on the advertisement- and brand memory. The following hypotheses are therefore created to answer the overall research question:

$H_{1a/b}$: *Arousal is positively related to better ad memory/brand memory*

$H_{2a/b}$: *Motivation is positively related to better ad memory/brand memory*

$H_{3a/b}$: *Positive facial expressions are related to better ad memory/brand memory*

$H_{4a/b}$: *Negative facial expressions are related to less ad memory/brand memory*

3.5 The Experiment

As mentioned, this thesis' research experiment was conducted in the artificial environment at the DNRG Senselab at CBS (Department of Marketing, 2014). The nature of the study is pioneering. In order to improve current marketing knowledge a better understanding of the consumers mind is attempted throughout this paper. The mind of the consumer is not well represented by solely asking consumers what they are thinking about. One must therefore look for other ways to probe these sources of consumer behaviour and go beyond self-reports to understand the unconscious sources of consumer decisions and memory formation (Ramsøy, 2014). Usages of both physiological- as well as neurological measurements to support the used self-reporting questionnaires are thus implemented throughout the study. The results may give hints for the future academic investigation.

However, with the compliment of neurological- and physiological measurements, it is believe that the questionnaires can contribute to the experiment. The questionnaires will help measure the subjects' ad preferences and what they consciously remember about the ads.

3.5.1 Pre-testing

A pre-test was conducted before running the actual study. Initially, the self-reporting questionnaire was shown to numerous subjects who therefore were excluded from our experiment. The subjects gave us feedback for possible modifications of the questionnaire. Subsequently, to eliminate uncertainties, four subjects within the target group were selected and recruited to test the experiment design (Hair, et al., 2009). The experiment and following questionnaires were improved according to the received comments and suggestions by critical people such as our supervisor, Thomas Z. Ramsøy, his research assistant and Ph.D. student, Dalia Bagdziunaite, as well as the pre-test subjects.

3.5.2 Overview of the Experiment

In order to test the hypotheses subjects viewed two documentaries consisting of two five minutes modules referred to as the background material, and eight minutes of advertisements separated into two blocks of eight ads. The first background material was about apes and the second about San Francisco. Both can be described as educational TV programs. The ad blocks, were places after the first and the second background material; resembled regular commercial breaks.

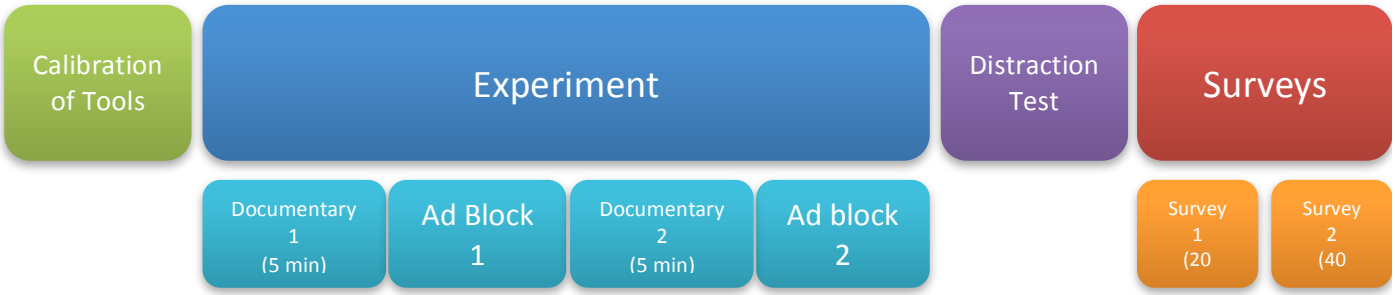


Figure 8: The Sequence of the Empirical Research Procedure

Additionally, two extra screens were placed on each side of the big screen distracting the participants with various pictures of landscapes, portraits of strangers, and quotes. The intention of the screens was to make the situation more realistic resembling that nowadays consumers watch television whilst managing other screens, such as smartphones or tablets (Pilotta, et al., 2004).

During this stimuli exposure EEG and facial expression measurements were applied, which were all integrated in the iMotions Attention Tool. These tools are used to measure the neurological, physiological, and behavioural reactions enhanced by stimuli (iMotions Global, 2014).

The advertisements used for the experiment were chosen based on four different ad categories to contribute to the literature by getting as broad a spectrum as possible. These categories consist of (1) fashion, (2) fast moving consumer goods (FMCG), (3) social cause, and (4) food. The advertisements were actual ads for real brands. However, the brands chosen were not available in Denmark, due to avoidance of brand recognition and therefore brand perception. The ads were all taken from American websites, and an informal check was made to verify that the brands had never been available in Denmark. Additionally, the ads were all around 30 seconds, the shortest being 22 seconds and longest 44 seconds, trying to keep the ads in the similar duration as possible.

Before the actual measurement a 20-30 minute calibration is made with the subject. This is done to create a baseline to ensure that the metrics measures what the research intends to measure (iMotions Global, 2014). This is further explained in the section of 6.1.2 Reverse Inference and Bivalence.

3.5.3 Ad Stimuli

The following table provides an overview of the stimuli used in the experiment summarizing the brand, the ad content and ad message.

Ad content	Brand name	Ad message
Social cause		
Child playing with bricks. The mother saying that he looks just like her father.	Casa Alianza	Every year more than 400 girls are sexually abused by their father
A fast-forward video of someone making a gun as a "balloon animal"	War Child	It's easy to convince children that killing is a game
Ordinary day for siblings at home. The phone rings. The sister answers it.	BC Children's Hospital	A sick child affects everyone
Fast pictures of people walking from door to door. The number "40" repeated.	World Vision	Keep helping hungry children
FMCG		
Blonde woman talking about baking soda with a bowl of it in front of her.	Arm & Hammer	Whiter teeth or your money back
A man chased in a hamster wheel by a bear whilst Bear Grylls' talking to him.	Degree	The more you move, the more it works
A woman at the office who has got her dress stuck in her underpants.	Infusium	Keep shine and protection
A couple who have had a "fun time" in the grass. Based on the TV series "The Bachelorette".	Clorox	Bleach it away
Fashion		
A happy family having fun with badminton, playing the piano, and the family dog.	Brooks Brothers	No explicit message - more a feeling
Man sneaks away from one-night-stand. He comes back since she's in his t-shirt.	Gildan	It's about time you had a favourite t-shirt
Different fashionable young people running around on floors of a big building.	Joe's Jeans	New collection out. Fall/Winter '13
A group of girls taking pictures of each other in a field with a caravan.	Pollux	No explicit message - more a feeling
Food		
A man says and likes "that's what she said" jokes at a barbeque.	A.1.	For almost everything – almost
A trip to a restaurant with grandmother, mother, and daughter. Girl's night out.	Olive Garden	When you're here you're family
A house of food is made and afterwards a wrecking ball as an avocado smashes it down.	Moe's Southwest Grill	Home wrecker burrito
A sexy, blond woman eats a salad in an animalistic way with it spilling all over her.	Carl's Jr.	Eat like you mean it

Table 2: Overview of Stimuli

3.5.4 Questionnaire

After having completed the experiment the subjects were brought into another room to continue with two questionnaires. To begin with participants were asked to do a visual reaction test as a distraction for two minutes (Cognitive Fun, 2012) followed by a distraction questionnaire about impulse buying behaviour and a mood test in order to collect their physiological state that could affect the results.

Finally, participants were given the initial questionnaire for the experiment, which was structured based on the NeuroEquity Battery (Ramsøy, 2014), which included the following sections:

1. Section is based on free recall about the participants' top-of-mind (TOM) memory of the ads
2. Section is based on category cued (CC) recall with the four categories listed
3. Section is based on recognition with a presentation of screenshots from the ad and subjective ad preference based on ad liking. Additionally, brand logo collages are shown at the end, with two false logos, one known, and one unknown.
4. Section with demographical data as age and nationality
5. Section about their physiological state that could affect the results. This is based on factors such as their well-being, medication, alcohol, smoking, sugar intake, caffeine consumption, and memory problems
6. Section based on asking participants about subjective knowledge of what they thought the test was about and whether or not they felt like they were affected by the ads
7. Section is based on whether or not they knew about the logos before the experiment, since this could have an impact on the results for the known brand's ad.

3.5.5 Sample Population

The sample population consists of 103 people, 51% women, and 49% male ranging from 20-35 years old and from 12 countries, including European countries such as Denmark, Italy, France, Austria, Iceland, Hungary, Lithuania, Norway, and Germany. Other countries include Venezuela, and Columbia. However, all participates recruited to the experiment are living in Copenhagen. 78% of the participants were Danish.

The experiment has been conducted with two additional master students, making it easier to recruit such a big sample. The invitation to the experiment was posted and shared on the social network, Facebook. Moreover, people were invited personally through texts, talks, and private messages.

Personal networks and word-of-mouth of the participants were highly encouraged. In practice, a significant percentage of the subjects joined through Facebook and personal references.

Additionally, to accelerate the recruitment process, prizes sponsored by the DNRG's Senselab were promised. Participants were therefore in the draw for prizes.

3.5.6 Test Procedure

Based on a positivistic approach to employ the structured methodology the created procedural guideline was followed (Saunders, et al., 2011). Initially, the subject was invited to sit down in front of the computer and was introduced to the procedure of the experiment. Subsequently, the EEG-calibration was conducted followed by the experiment presenting the two documentaries and various advertisements. After completing the experiment the participant was asked to conduct one more distraction test before filling out two questionnaires following the study. The whole experiment, including calibration, took approximately 90 minutes per subject.

Part 4: Results

The aim of this study has been to examine how ad-induced emotions affect the viewer's ad- and brand memory formation and the relation of these two. Thereby providing a better understanding of brand memory, and how this knowledge can be used to improve advertising. To do this, the 103 participants watched 16 ads embedded in two documentaries. Their emotional reactions were measured with EGG and facial coding. Moreover, memory scores were collected via a survey. The following section will present the results, beginning with the different survey outcomes and followed by the emotional responses.

4.1 Survey Results

The subsequent results are drawn from the participants' answers given after viewing the ads for the experiment. For all ads participants answered the same questions. In the appendix 11.1 an overview of the survey can be found.

4.1.1 The Ad Memory Score versus the Brand Memory Score

As previously described, the authors have established two different memory scores, based on the survey results. Here, a free recall task, a cued recall task, and lastly, recognition of the different ads or brands have been taken into consideration.

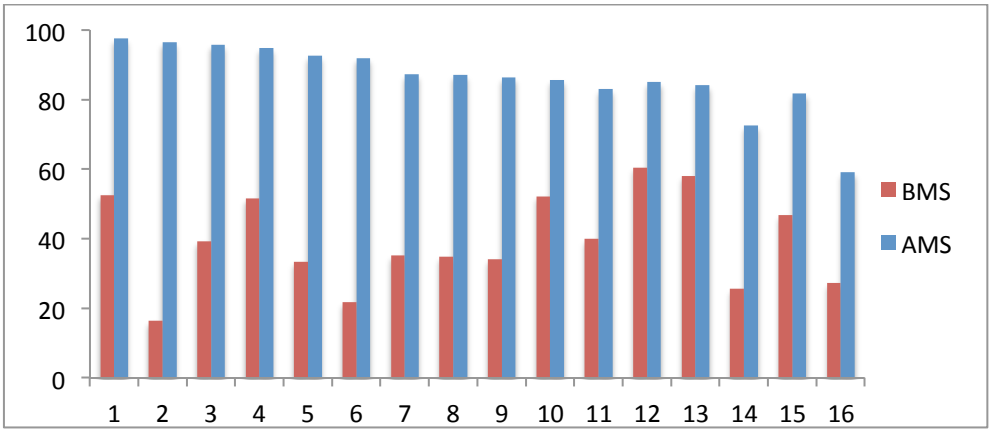


Figure 9: Overview of BMS and AMS

The above graph shows the distribution of both AMS and BMS of the 16 tested ads. It is noticeable that on average participants formed better memories of the ad than the brand. Scoring on a scale from 0 to 100, AMS ranges from 59 to 98, whereas BMS ranges from 16 to 68. Further, there are considerable differences among ads. For instance, ad two has the lowest BMS (16) but nevertheless has a high AMS (97). Contrary, ads, such as 12 and 13, have lower AMS (84;84), but considerable high BMS (60;58). Ad 16 instead scores relatively low on both scores; AMS (59) and BMS (27).

To get a better understanding of AMS and BMS the two have been correlated. The graph below shows that AMS and BMS are negatively correlated ($t = -262.6\,;\ p < 0.0001$). This means that the better the memory is for the ad the worse brand memory will be.

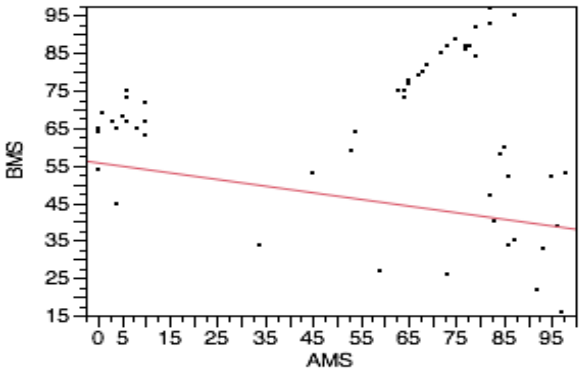


Figure 10: Correlation of AMS & BMS

In order to get a better overview of the memory scores, results were grouped according to ad categories, where the following distribution has been found.

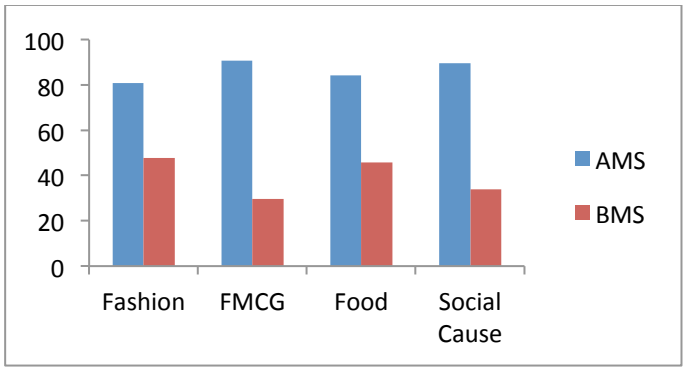


Figure 11: AMS & BMS based on Categories

The fashion category has the lowest AMS (81), but the highest BMS (48). FMCG has the highest AMS (91), but yet the lowest BMS (30). Both food and social cause ads are consequently with both values lying in between fashion and FMCG values. The food category has the second lowest AMS (84), but the second highest BMS (46) and social cause ads having the second highest AMS (89) plus the second lowest BMS (34).

When performing a one-way-ANOVA, to compare the different scores for the ad-categories, the same can be seen. Concerning AMS, the FMCG and social cause categories perform better than fashion and food ads. However, when looking at BMS, the results are reverse. Interestingly, the one-way-ANOVA results clearly demonstrate that BMS and AMS oppose each other.

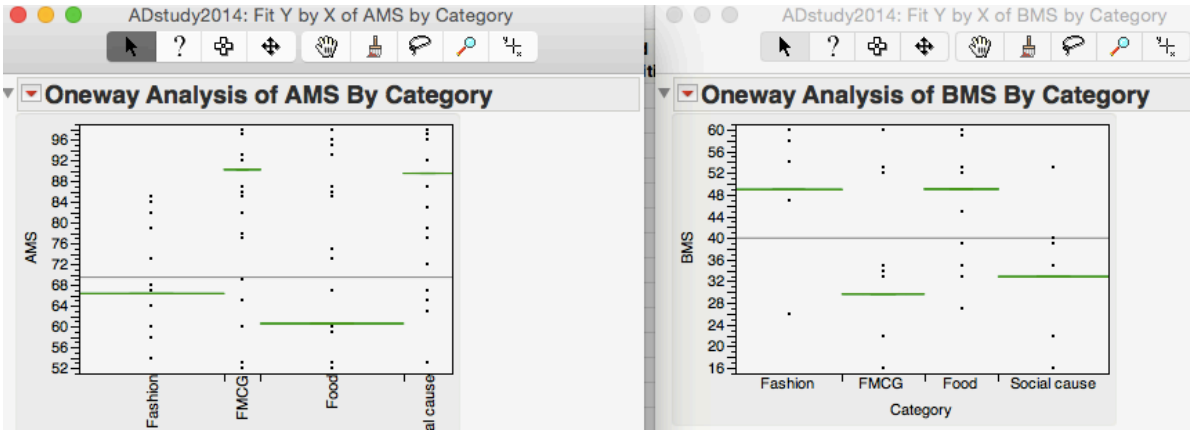


Figure 12: Results of One-way Anova for AMS & BMS

4.1.2 Category Classification

After having seen screenshots of the watched ads, participants were asked to choose the specific category which the ad belongs too. Below is shown the percentage of people that answered correctly.

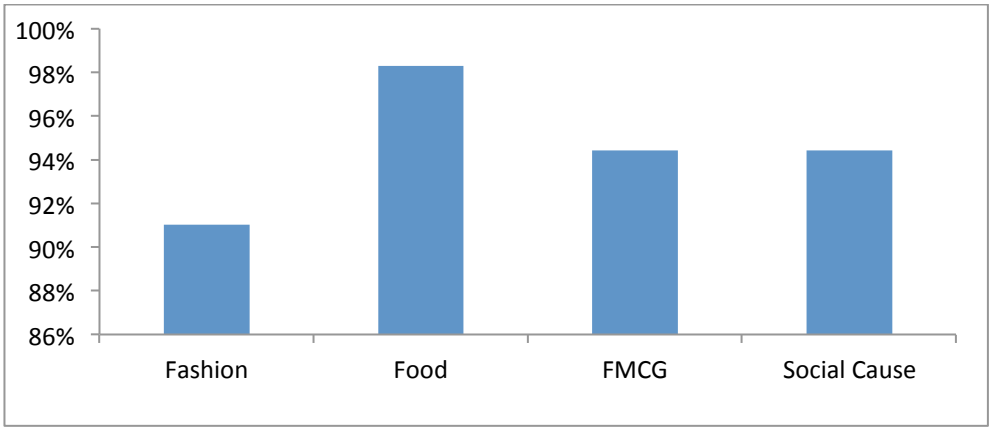


Figure 13: Category Classification of the Ads

Regarding the task to associate ads with the right category, it is noticeable that the results are relatively high since all categories score over 90%. However, the graph still shows differences among the categories. Fashion is the lowest with 91%, whereas food is the highest with 98%. The last two categories FMCG and social cause have the same score of 94%.

4.1.3 Brand Classification

Participants were further able to see different brand logos, which were corresponding to the particular category of the ad. Here, participants were asked to choose the logo in which they thought the ad belonged to. The graph below shows the percentage of people that answered correct for each category. Food ads have the highest score with 82%, followed by fashion ads with 75%. The category of social cause received a percentage of 62% while FMCG has a score of 49%.

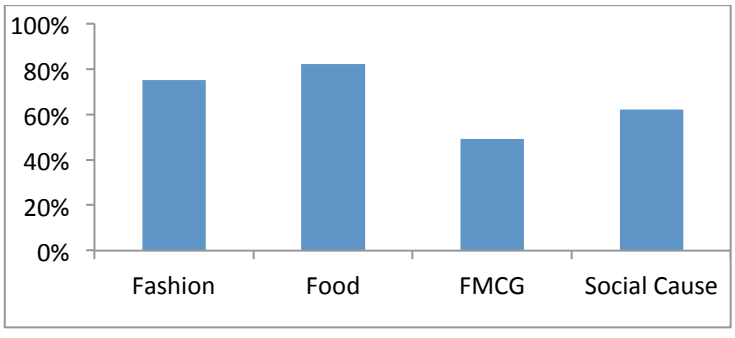


Figure 14: Brand Classification of the Ads based on Categories

4.1.4 Ad Likability

Further in the survey, participants were asked to rate the watched ads on how much they liked the ad. This was done on a scale from zero being "*not at all*" to ten, which rates as "*very much*". The results according to the categories can be seen below. Social cause ads are most liked with a score of 5,8 whilst FMCG and food ads are relatively similar with a score of 4,8 and 4,6. The fashion category received however the lowest rating with 4,2.

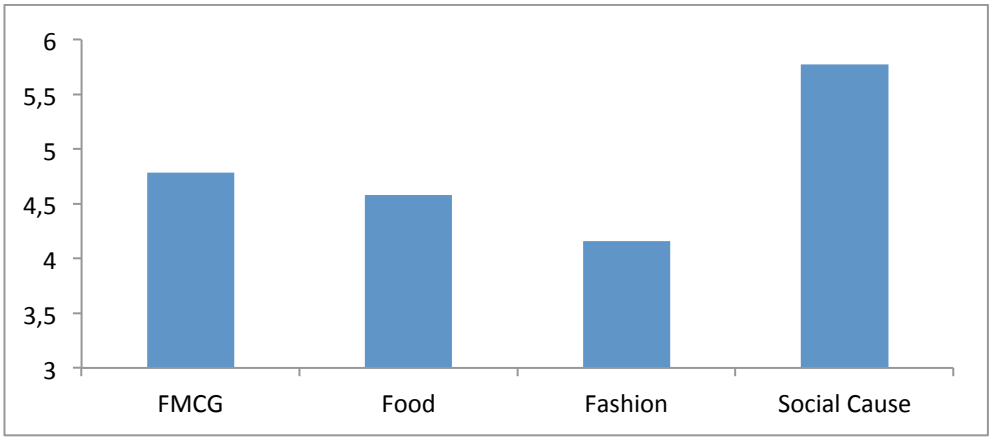


Figure 15: Ad likeability Scores based on Categories

By correlating the two memory scores of AMS and BMS to ad likeability the following graph is found.

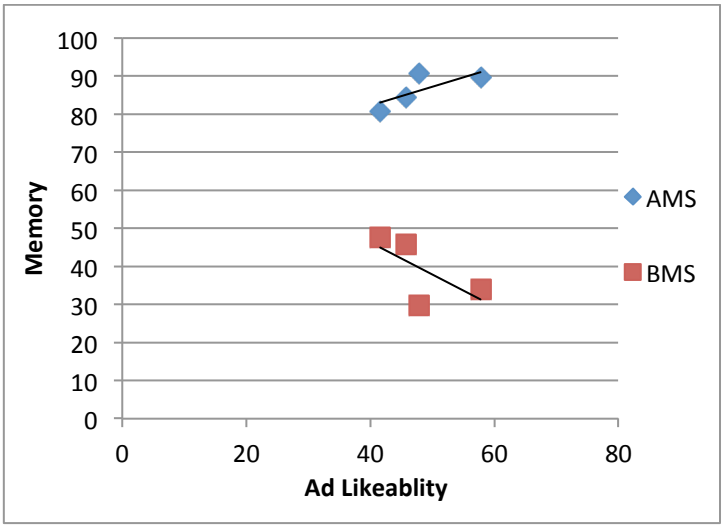


Figure 16: Correlation of Memory Score and Ad Likeability

The graph shows that increased ad likeability leads to higher AMS. At the same time the reverse is true for BMS; the better an ad is liked the worst brand memory seems to be.

4.1.5 Associations

In order to better understand the participants' opinion of the watched ads they were asked to write down associations according to each individual advertisement. This was done later in the survey, after showing participants screenshots of the ads, which is why these results have not been included in the memory scores. The results can be seen below. After counting the total amount of associations they were categorized into positive, negative, and factual. These results are likewise shown in the graph below.

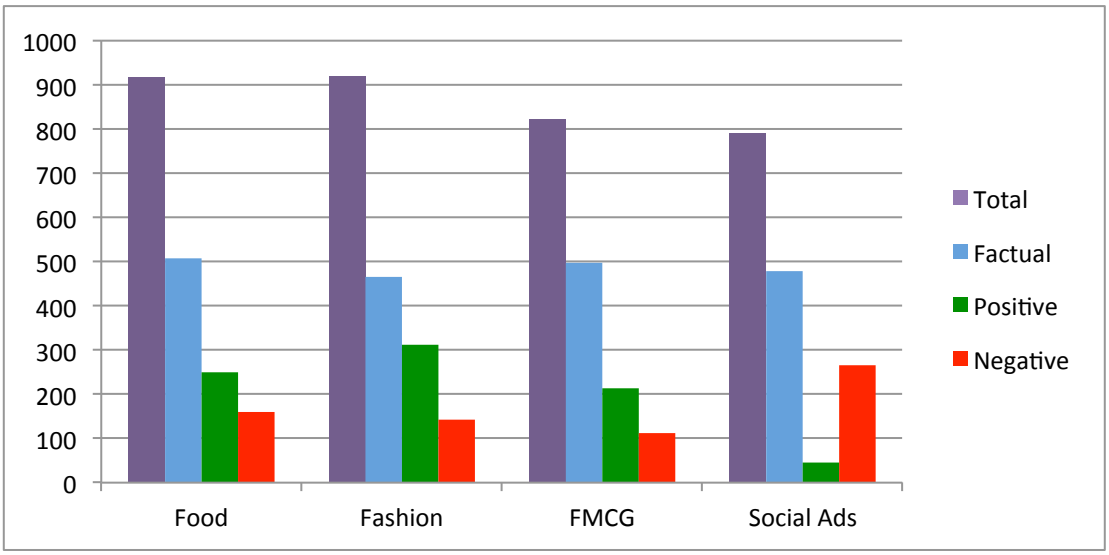


Figure 17: Number of Associations

As the diagram shows, the four categories differ in total number of associations with the fashion and food ads having the most with 921 and 917 respectively. These are followed by FMCG ads with 822 and social cause ads with the least number of associations, being 790. Concerning the factual associations the ads only differ slightly. Food ads (507) are followed by FMCG (497) and social cause ads (479). Fashion has the lowest amount with 466 factual associations but scores highest with positive associations (312). Food and FMCG ads are relatively similar with 250 and 213 positive associations. The social cause category has instead the lowest amount of positive associations (45) whilst receiving by far the highest amount of negative associations (266). Additionally, the food category received 160 negative associations and fashion 143, where FMCG has the lowest amount of negative associations with 112.

Similar to correlating ad likeability to AMS and BMS it has been found to be interesting to look at how the number of associations which participants wrote down relate to the two memory scores. These results can be seen below.

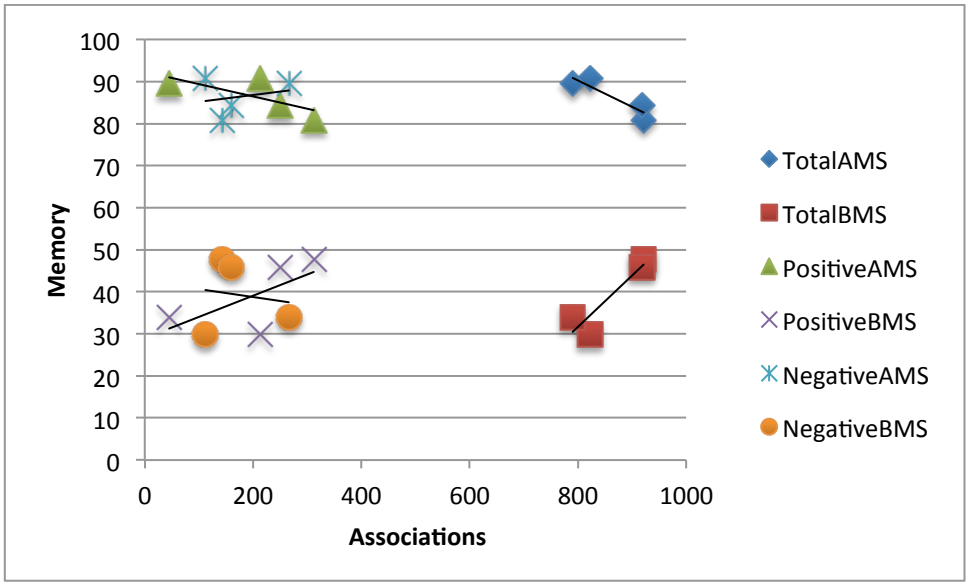


Figure 18: Associations Correlated with Memory

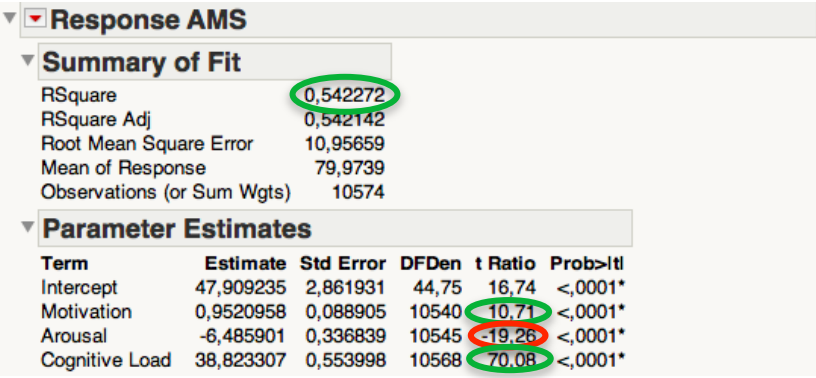
The grid demonstrates that the more associations' participants had, the better the brand memory, but worse the ad memory. Moreover, it is found that positive associations are negatively related to AMS while being positively related to BMS. The opposite holds true for negative associations being positively related to AMS whilst being negatively related to BMS.

4.2 Emotional Responses

After having presented general results from the survey, the following will present data drawn from the EEG and facial coding while participants were viewing the ads. First, results for AMS from the EGG will be shown, followed by data including both EGG and facial coding, and results based on the ad categories. Finally, the same will respectively be done for BMS.

4.2.1 Predicting the Ad Memory Score

The table below shows the found data from the EGG for AMS.



Response AMS

Summary of Fit

RSquare	0,542272
RSquare Adj	0,542142
Root Mean Square Error	10,95659
Mean of Response	79,9739
Observations (or Sum Wgts)	10574

Parameter Estimates

Term	Estimate	Std Error	DFDen	t Ratio	Prob>|t|
Intercept	47,909235	2,861931	44,75	16,74	<,0001*
Motivation	0,9520958	0,088905	10540	10,71	<,0001*
Arousal	-6,485901	0,336839	10545	-19,26	<,0001*
Cognitive Load	38,823307	0,553998	10568	70,08	<,0001*

Figure 19: EGG Data for AMS

From the EEG data alone it is possible to predict 54% of the variance of AMS. Effects of both arousal $(t = -19{,}26;\ p < 0{,}0001)$ and motivation $(t = 10{,}71;\ p < 0{,}0001)$ are significant and strong predictors. Arousal has a strong negative effect on AMS, falsifying $H_{1a,}$ whereas motivation has a strong positive effect on AMS, supporting H_{2a}. Moreover, it can be noticed that cognitive load $(t = 70{,}08;\ p < 0{,}0001)$ has a very strong positive effect on ad memory.

If facial coding is included in the model, prediction power raised from 54% up to 72% of the variance. As the R^2 is increased considerably, facial coding adds value, when predicting AMS. The results including both EGG and facial coding can be seen in the table below. Emotions that are noteworthy are circled in.

R^2	0.7222	p < 0.0001

Term	Estimate	Std Error	DFDen	t Ratio	Prob>|t|
Intercept	34,452285	4,640715	30,63	7,42	<,0001*
Joy	-133,6038	33,58736	3846	-3,98	<,0001*
Anger	-1,112901	1,534825	3858	-0,73	0,4684
Surprise	101,97328	8,34454	3841	12,22	<,0001*
Fear	-1,455621	1,62385	3848	-0,90	0,3701
Contempt	4,2071024	4,007749	3852	1,05	0,2939
Disgust	-5,879426	2,77429	3860	-2,12	0,0341*
Sadness	7,3479333	1,077239	3844	6,82	<,0001*
Confusion	-0,541148	0,243493	3839	-2,22	0,0263*
Frustration	-0,028712	0,651708	3847	-0,04	0,9649
Neutral	23,976558	1,182014	3842	20,28	<,0001*
Positive	31,212813	1,479258	3844	21,10	<,0001*
Negative	-0,072235	0,041894	3838	-1,72	0,0847
Motivation	-0,455055	0,112053	3843	-4,06	<,0001*
Arousal	2,8949446	0,437561	3843	6,62	<,0001*
Cognitive Load	11,58968	0,983148	3815	11,79	<,0001*

Figure 20: EGG & Facial Coding for AMS

In the first column the different parameter estimates can be seen, whereas the t-ratio column shows how the parameters affect memory. Positive numbers show that the higher a parameter is the better memory will be, whereas a negative number will yield the opposite effect. Further, the bigger the number is the stronger the effect will be. When looking at the different parameter estimates, the strongest positive effects can be seen from positive facial expressions ($t = 21{,}10;\ p < 0{,}0001$), followed by neutral ($t = 20{,}28;\ p < 0{,}0001$) and surprise ($t = 12{,}22;\ p < 0{,}0001$). Motivation ($t = -4{,}06;\ p < 0{,}0001$) seems to have the strongest negative effect, however as it can be seen compared to the other t-values, the effect is not as strong. The data thereby, verifies H_{3a} and H_{4a}. Moreover, it can be noticed that out of the 16 measured emotions, 8 emotions do not have any significant effect. However, both arousal and motivation are significant.

4.2.2 Categorized Emotional Responses based on the Ad Memory Score

The table below presents effects of emotional responses based on the EGG and facial coding for the four ad categories. Circles are again being used to point out different things that are noteworthy.

CATEGORY/ SCORE	Fashion	FMCG	Food	Social cause
Joy	14,97		-9,34	
Anger	-12,5	-4,58	8,77	3,34
Surprise	5,5	-2,22		-2,25
Contempt	-4,69	-7,51		
Disgust	7,16	4,8	5,59	-3,94
Sadness	7,72	-6,28		
Confusion	10,19	-3,21	-13,14	-4,55
Frustration		-3,25	-2,02	-4,79
Neutral	-4,21		-4,91	2,73
Positive	-22,99	-3,02	13,47	2,02
Motivation	5,3	4,84	-11,77	-3,99
Arousal	3	3,46		
Cognitive Load	-7,3			9,02
model R^2	0,6776	0,8745	0,8927	0,7488

Figure 21: EGG & Facial Coding for AMS based on Categories

In the last row, the R^2 is shown for the different categories. Here, it is noticeable that all categories, except fashion, have an increased value compared to the previous general model ($R^2 = 72$). Prediction power is the highest for food ads ($R^2 = 89$), followed by FMCG ($R^2 = 87$). For the fashion category ($R^2 = 68$) prediction power has decreased, and for social cause ads ($R^2 = 75$) it slightly increased. Here, it should also be mentioned that for fashion ads only the emotion "frustration" is insignificant. For food ads with the highest R^2 four emotions are insignificant. Concerning the remaining two categories they both are lacking two emotions.

Looking at the different emotions it is possible to see that there is no emotion that has the same effect across categories. Moreover, looking at FMCG and social cause there are no emotions that have a particularly strong effect. Concerning FMCG all t-values are between –7,51 and 4,84. For social cause ads all t-values are between –4,79 and 3,34. However, it is noticeable that cognitive load has a relative strong effect ($t = 9{,}02$) on social cause ads. For the fashion category, four different emotions seem to have a relatively strong effect; joy ($t = 14{,}97$), anger ($t = -12{,}5$), confusion ($t = 10{,}19$) and positive ($t = -22{,}99$). Concerning food ads, joy ($t = -9{,}34$) confusion ($t = -13{,}14$), positive ($t = 13{,}47$) and motivation ($t = -11{,}77$) are of interest. Interestingly, three of the emotions being joy, confusion, and positive, overlap for the two categories.

4.2.3 Predicting the Brand Memory Score

After having presented results for AMS, the same will now be done for BMS. The table below shows EGG data for BMS.

Response BMS

Summary of Fit

RSquare	0,239972
RSquare Adj	0,239731
Root Mean Square Error	8,903368
Mean of Response	43,46371
Observations (or Sum Wgts)	9465

Parameter Estimates

Term	Estimate	Std Error	DFDen	t Ratio	Prob>|t|
Intercept	50,614517	2,52125	15,49	20,08	<,0001*
Motivation	0,0187318	0,082316	9446	0,23	0,8200
Arousal	-1,301212	0,300435	9460	-4,33	<,0001*
Cognitive Load	-7,970032	0,6842	9461	-11,65	<,0001*

Figure 22: EGG Data for BMS

Results of the EGG, concerning BMS show that it is possible to predict 24% of the variance. Compared to a prediction rate of 54% for AMS, this is much lower. As in the model predicting AMS, arousal ($t = -4{,}33;\ p < 0{,}0001$) is negatively impacting BMS; falsifying $H_{1b.}$ Motivation ($t = 0{,}23;\ p < 0{,}8200$) is not significant, thereby also not supporting H2b. Moreover, it can be noticed that cognitive load ($t = -11{,}65;\ p < 0{,}0001$) has a strong negative effect on brand memory.

If facial coding is included in the model prediction power raised from 24% up to 42% of the variance. Similar to AMS the R^2 is increased; therefore facial coding also adds value, when predicting BMS. However, the prediction power is still much lower than for AMS. The results including both EGG and facial coding can be seen in the table below. Emotions that are noteworthy are circled.

R^2	0.4221	p< 0.0001			
Term	**Estimate**	**Std Error**	**DFDen**	**t Ratio**	**Prob>|t|**
Intercept	27,250853	3,880496	68,99	7,02	<,0001*
Joy	477,64925	91,37749	3490	5,23	<,0001*
Anger	-6,8638	2,38486	3523	-2,88	0,0040*
Surprise	38,926203	11,79288	3535	3,30	0,0010*
Fear	2,5562019	2,083926	3467	1,23	0,2200
Contempt	-65,93795	5,298347	3531	-12,45	<,0001*
Disgust	10,04594	3,882481	3193	2,59	0,0097*
Sadness	-2,261227	1,501383	3536	-1,51	0,1321
Confusion	3,5632133	0,710168	3536	5,02	<,0001*
Frustration	-6,510232	1,071944	3514	-6,07	<,0001*
Neutral	18,211675	2,990296	3487	6,09	<,0001*
Positive	-55,89425	9,732045	3520	-5,74	<,0001*
Negative	16,467444	2,111373	3513	7,80	<,0001*
Motivation	-0,027231	0,141011	3528	-0,19	0,8469
Arousal	0,0580105	0,549245	3536	0,11	0,9159
Cognitive Load	-0,664013	1,311408	3523	-0,51	0,6127

Figure 23: EGG & Facial Coding for BMS

When looking at the different parameter estimates the strongest effects can be seen from contempt ($t = -12{,}45;\ p < 0{,}0001$) negatively influencing BMS. The strongest positive effect occurs from negative facial expressions ($t = 7{,}80;\ p < 0{,}0001$) thereby falsifies H_{4b}. Moreover, H_{3b} is also not supported as positive ($t = -5{,}74;\ p < 0{,}0001$) facial expressions are negatively related to BMS. All other emotions only have intermediate effects on BMS ranging from t-values between –6,07 to 6,09. Moreover, out of the 16 measured emotions 7 emotions are not significant. However, opposing to AMS both motivation and arousal are not significant in the model.

4.2.4 Categorized Emotional Responses based on the Brand Memory Score

The table below presents effects of emotional responses for BMS based on the EGG and facial coding for the four ad categories. Circles are once again applied to point out noteworthy data.

CATEGORY/ SCORE	Fashion	FMCG	Food	Social cause
Joy	-3,02	-2,38	2,26	
Anger	-5,15	6,99		-3,07
Surprise	4,30	6,40		5,61
Contempt	-2,30	6,56		-9,18
Disgust	2,09	-5,30		
Sadness	13,56	14,01		
Confusion	-1,97	-6,40	-14,23	4,47
Frustration		3,81		-4,60
Neutral	4,36	7,35		-4,42
Positive	18,10	8,33		
Motivation	2,61	-2,94	-2,83	2,88
Arousal	4,31	6,36	4,14	-2,44
Cognitive Load			2,33	-7,69
model R²	**0,7530**	**0,9065**	**0,9340**	**0,7735**

Figure 24: EGG & Facial Coding for BMS based on Categories

The last row shows the different R^2 values for the categories. Compared to the previous model with a R^2 of 42% the prediction power has increased considerably for all categories. Prediction power is the highest for food ads ($R^2 = 93$), followed by FMCG ($R^2 = 90$) and social cause ads ($R^2 = 77$). The fashion category ($R^2 = 75$) has the lowest prediction power. Here, the order of the prediction strength across the different categories has remained the same compared to the AMS model.

Based on different effects of emotions, it is of interest that only surprise has the same effect positively impacting BMS across all categories, except for social causes, where it is insignificant. As in the model for AMS, frustration is the only emotion insignificant in the fashion category.

Further, sadness ($t = 13{,}56$) and positive ($t = 18{,}10$) emotions have a strong effect on BMS. Concerning FMCG it is clear that all tested emotions have a significant effect on BMS, whereas in the fashion category sadness ($t = 14{,}01$) and positive ($t = 8{,}33$) facial expression have the strongest effect. Interestingly, for the food category only four emotions remain significant where confusion ($t = -14{,}23$) is the only emotion with a strong effect. Lastly, Social cause only has one emotion that has a fairly strong effect; contempt ($t = -9{,}18$). However, here cognitive load can be mentioned also having a fairly strong negative effect ($t = -7{,}69$).

Part 5: Discussion

Based on the above reported findings the following section will take a step-wise interpretation and discussion of the presented results. Starting with the hypothesis, the discussion will continue with explorative aspects and additional survey results. This is integrated with discussing findings in terms of existing literature, analysing whether the results support or oppose existing theories.

5.1 Ad-Induced Arousal and Motivation can Predict Memory Formation

As previously explained, the term *motivation* rests at the intersection of consciousness and unconsciousness. Motivation moreover includes the intensity of a desire or a need and the incentive or reward value of a goal. *Arousal* on the other hand is essentially being alert; both physically and mentally (Kron, et al., 2013; Hamann, 2012). Various body systems and hormones are involved and contribute to alertness and readiness to move. In order to find out whether arousal and motivation are positively related to respectively ad- and brand memory, the hypotheses were investigated using EEG data. Results are summarized in the table below.

	AMS (R^2 = 0,54)		BMS (R^2 = 0,24)	
	t-ration; Prob>ltl	Hyp.	t-ration; Prob>ltl	Hyp.
Motivation	(t= 10,71; p<0,0001)	H_{2a}: Motivation is positively related to better ad memory	(t= 0,23; p<0,8200)	H_{2b}: Motivation is positively related to better brand memory
Arousal	(t= -19,26; p<0,0001)	H_{1a}: Arousal is positively related to better ad memory	(t= -4,33; p<0,0001)	H_{1b}: Arousal is positively related to better brand memory

Table 3: EEG Data for AMS & BMS; including Hypotheses

The results based on these emotional responses present interesting findings. First, it was found that the EEG can predict 24% of the BMS variation and 54% of the AMS variation. The EEG can

therefore be considered useful when predicting memory formation. Moreover, the prediction power for AMS is much higher than for BMS, which indicates that arousal and motivation are generally better able to predict ad memory than brand memory.

Before discussing the individual results of both arousal and motivation it should be noted that they are highly interrelated, thus affecting each other (Ramsøy, 2014). The following graph, figure 25, illustrates the tested advertisings, demonstrates this relationship. Here, one can see that arousal and motivation are interrelated in a systematic fashion, strengthening the argument that both instances need to be considered simultaneously to best understand emotional responses. Bradley et al. (1992) further support the argument stating that interpretation of memory scores become more accurate when not only measuring arousal, but also controlling for the direction of the emotional response. This is done through motivation in the presented study. The following will discuss effects of arousal and motivation individually to ease readability.

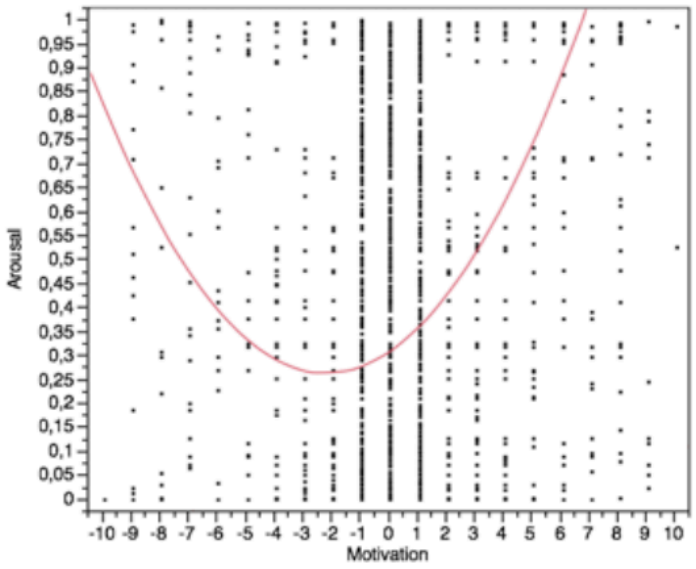


Figure 25: Arousal-Motivation Plot

As stated in the theory section, research has shown that increased **arousal** can increase attention, and thereby improve memory (Libkuman, 1999). Therefore, it is hypothesised that increased arousal will improve both ad and brand memory. However, results show that arousal has a strong negative relationship with AMS $(t = -19{,}26; p < 0{,}0001)$, while also having a negative relation with BMS $(t - 4{,}33; p < 0{,}0001)$. Therefore H_{1a} and H_{1b} are not supported. This is counter-

intuitive finding, as results of previous research have demonstrated that higher arousing ads lead to better memory (Kim & Kim, 2013; Migita, 2011; Bradley, et al., 1992).

However, the results still show significant and strong results for arousal, which is why it can be concluded that arousal is important when discussing memory formation. It is noticeable that research shows that arousal not always supports memory, but can also impair memory (Bradley, et al., 1992). Typically, it was found that higher levels of arousal lead to lower memory scores, when central versus peripheral content was tested. Here central content relates to the main character or theme, whereas peripheral content is irrelevant to the source of the emotional arousal (Migita, 2011). These studies have shown that higher arousal led to higher memory of central content, whereas to lower memory of peripheral content (Bradley, et al., 1992; Migita, 2011). Looking at the results for AMS and BMS it can be noted that the effect is much stronger for AMS, but that arousal is still negatively impacting both scores. Based on these results it cannot be argued that one of the two can be considered central content. In this line, ads might be perceived as irrelevant in general, thereby being peripheral content, as they were imbedded within two documentaries. At the same time, the results did show high memory scores for several ads, which is why the results for arousal should be examined further to gain a better insight on how arousal affects memory.

As the table below demonstrates, one thing that should be noted is that facial expressions seem to explain many of the same effects as arousal. When predicting arousal using facial expressions as parameter estimates a R^2 of 23% can be found. This indicates that arousal should not be looked at separately, when integrated into a model with facial expressions. Looking at arousal and facial expressions together might then provide better insights into how arousal affects memory.

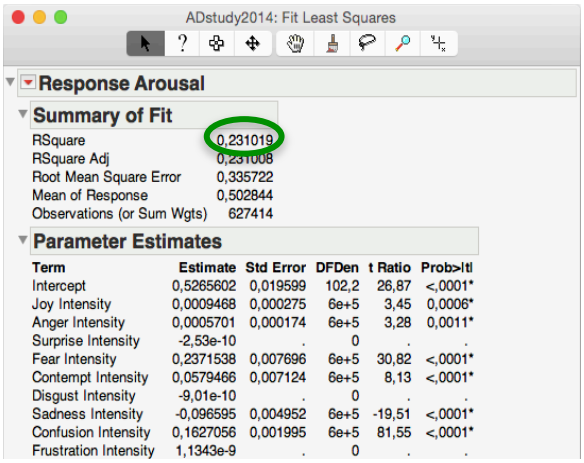


Figure 26: Overlap between Arousal and Facial Expressions

Figures 21 and 24 in the result section show both arousal and facial expressions based on the categories. In the table it is possible to see, that arousal is actually either positively related to memory or insignificant for all categories. Only for social cause concerning the prediction of BMS it is slightly negatively related. Taking out one concrete example, the FMCG category predicting AMS is described in detail.

CATEGORY/ SCORE	FMCG
Joy	
Anger	-4,58
Surprise	-2,22
Contempt	-7,51
Disgust	4,8
Sadness	-6,28
Confusion	-3,21
Frustration	-3,25
Neutral	
Positive	-3,02
Motivation	4,84
Arousal	3,46
	1,99
Cognitive Load	
model R^2	0,8745

Figure 27: Emotions predicting FMCG

Here, it is possible to see, that arousal is positively impacting AMS. Furthermore, it is striking that most of the emotions have a negative effect on memory. It should be taken into consideration that first arousal is bivalent; meaning that both high positive and high negative arousal will impact memory, where from only looking at the arousal score it is not possible to tell what the driving factor is. Second, many of the facial expressions explain effects of arousal, as demonstrated in the table above. Taking these two aspects together, it can be argued that the previously found negative impact of arousal arises from the negative emotions. As Figure 26 above shows, when including facial expressions in the model, it can be seen that the facial expressions explain the negative impact, resulting in arousal actually having a positive impact. This discussion emphasises again that it is difficult to draw definite conclusions based on the results. Looking at different factors can

quickly change the overall picture. As the previous discussion has shown, the found results might actually not contradict previous research, but rather demonstrate that many different factors exit, which need to be taken into consideration.

After having discussed results of arousal, the same will be done for **motivation**. As it can be seen in the table above, motivation has a positive relationship with AMS ($t = 10{,}71; p < 0{,}0001$), accepting H_{2a}. Concerning BMS motivation ($t = 0{,}23; p < 0{,}8200$) has no significant effect; therefore not supporting H_{2b}. Consequently, it can be argued that increased motivation is beneficial for ad memory, whereas it has no effect on brand memory.

As mentioned, motivation can be seen as a factor that encourages a person to perform and succeed at a task. In an experiment Bargh (2002) found that motivations and goal pursuit could be externally activated. He thereby demonstrated that presenting participants with an encouragement motivates them to pursue their goal. Applying this to the current findings, one assumption that can be made is that ad content triggers consumer goals, supporting ad memory. However, as motivation is in the presented study not significant in terms of brand memory, it indicates that the unknown brands did not trigger any goals. This however leaves room for the assumption that results would differ for known brands. As these would potentially trigger aims, as consumers might have relevant associations connected to them, thereby increasing motivation to process the content.

In relation to this, Bradley and colleagues' (1992) findings can be discussed. As previously debated their study has shown that arousal strongly impacts memory. Further, they defined pleasant events as engaging approach or appetitive behaviour - in other words positive motivation. However, their finding suggests that pleasantness does not have an effect on memory tested through free recall and recognition. This is partly supported by the presented findings. As for BMS motivation had no significant effect. Overall, Bradley and colleagues (1992) conclude that when emotions are defined according to the dimensions of pleasantness and arousal, memory is mainly predicted by the intensity, but not the valence of the specific emotion. It can be argued that the present results support this since arousal has a stronger impact on memory than motivation.

This has been considered an interesting finding, why all ads were plotted in an arousal and motivation matrix providing the following result.

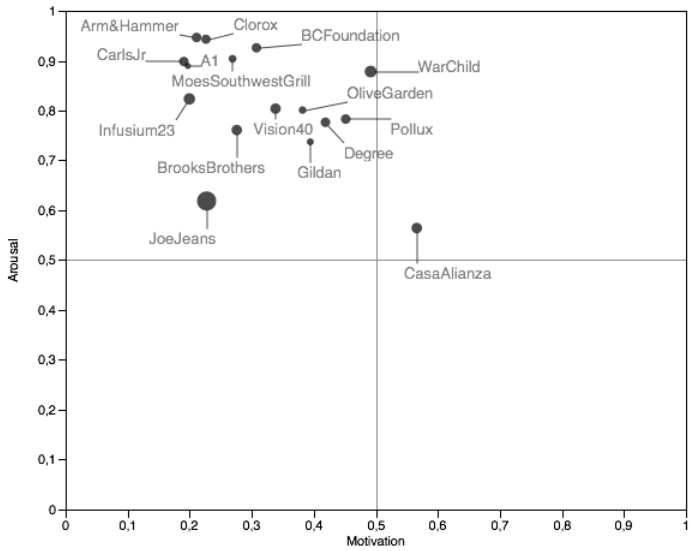


Figure 28: Arousal/Motivation Plot based on Individual Ads

In line with the previously made argument the plot shows that all ads score high on arousal, whereas low on motivation. Thereby, all ads are located in the upper left quarter. This could therefore also be one explanation of the relatively strong impact of arousal, whereas motivation did not impact BMS. It further demonstrates that a similar study should be conducted containing ads that vary more across arousal and motivation in order to see if results would differ.

5.2 Ad-Induced Facial Expressions can Predict Memory Formation

After having discussed how arousal and motivation affect memory, it will now be examined how positive and negative facial expressions influence memory formation. Facial coding was used to test the third and fourth hypotheses. Overall results using facial coding will be discussed first, followed by the separate discussion of positive and negative facial expressions.

To analyse whether facial coding improves the prediction power of memory formation, facial coding data was included into the testing model. For both BMS and AMS the prediction rate increased substantially from 24% to 42% for the BMS, and 54% to 72% for the AMS. Therefore, it can be concluded that facial coding and EGG should be used simultaneously to insure the best prediction of memory scores. This supports existing literature on facial coding demonstrating that it is a valid tool to measure emotions and consequently, testing advertising effectiveness (Lewinski, et al., 2014). Furthermore, results show that overall emotional responses can better predict AMS than BMS, since the R^2 for AMS (72%) is much higher than for BMS (42%).

	AMS (R^2 = 0,72)		BMS (R^2 = 0,42)	
	t-ration; Prob>ltl	Hyp.	t-ration; Prob>ltl	Hyp.
Positive	(t= 21,10; p<0,0001)	H_{3a}: Positive facial expressions are related to better ad memory	(t= -5,74; p<0,0001)	H_{3b}: Positive facial expressions are related to better brand memory
Negative	(t= - 1,72; p<0,0847)	H_{4a}: Negative facial expressions are related to less ad memory	(t= 7,80; p<0,0001)	H_{4b}: Negative facial expressions are related to less brand memory

Figure 29: Effects of Positive and Negative Emotions on AMS and BMS

The facial coding results show, that while positive facial expressions ensure AMS ($t = 21{,}10; p < 0{,}0001$), and therefore accepting H_{3a}, this does not hold true for BMS ($t = -5{,}74; p < 0{,}0001$) where positive facial expressions relate to negative BMS, rejecting H_{3b}. This means that while positive emotions induced by the shown advertisement are good for ad memory, it is the opposite for brand memory. The presented results partly support prior research that has demonstrated that positive emotions are beneficial for memory (Lewinski, et al., 2014; Mehta & Purvis, 2006; Millward Brown Lansdowne, 2005). For example Lewinski and colleagues (2014) used facial coding to relate happiness to advertising effectiveness, and Teixeira and collegaues (2012) showed that positive emotions prompt approach and retaining of a stimulus. In the same line Bradley et al. (1992) show that affective valence and memory performance have a positive relationship, where affective valence can be measured via positive emotions. Therefore, results of this study imply that an ad that is extremely funny can trigger positive facial expressions leading to higher ad memory. However, this might damage brand imprinting.

Based on the above findings it can be further discussed why positive emotions lead to lower BMS. One argument is in line with the previously introduced model of the creative magnifier (Millward Brown Lansdowne, 2005). The model demonstrates that consumers might focus too much on the creative element of an ad, where consumers focus on the advertisement's storyline rather than the advertised brand, leading to high AMS, but lower BMS. To explore this further, the interrelationship between AMS and BMS, as illustrated in figure 10, in the results section shows that based on the tested advertisements AMS and BMS are negatively correlated. Thus higher scores of AMS are related to lower scores of BMS. This indicates that an ad that creates strong ad memory will have lower brand memory, thereby "cannibalizing" on the brand memory. As Steidl (2014) mentions, an ad without brand memory can be considered impractical, demonstrating the importance of this finding. However, it should be noted that the results are based on the created

BMS and AMS scores. Therefore, there is a possibility of participants forming brand- or ad memories that have not been measured with the current tools used.

Another interesting finding is that negative facial expression support brand memory formation ($t = 7{,}80; p < 0{,}0001$) and thereby rejecting H_{4b}. However, it should be noted that H_{4a} is likewise not supported, since negative facial expressions do not have a significant effect on ad memory ($t = -1{,}72; p < 0{,}0847$). The finding that negative facial expressions can lead to better memory contributes to existing literature. As discussed by Levine and Edelstein (2009), negative emotions can lead to a stronger focus on a stimulus thereby reducing memory errors. Moreover, they discuss that both positive and negative emotions can increase working memory capacity, where the strength of the emotion is more important than the direction. This argument can also be supported by the presented results, as overall both positive and negative emotions yield significant. At the same time, it should be noted that research has shown that negative emotions can prompt avoidance and rejection of a stimulus (Teixeira, et al., 2012). Thereby it would negatively impact memory. In terms of advertising, current research has mainly focused on explaining effects of positive emotions and is lacking a profound understanding of negative facial expressions (Teixeira, et al., 2012; Lewinski, 2014). Therefore, the authors do not advise marketers to focus on triggering negative emotions in order to strengthened brand memory. The understanding should rather be that when ads trigger negative facial expressions it does not necessarily need to be perceived as detrimental to advertising effectiveness.

5.3 Explorative Analysis of Neuroscientific Methods

After having discussed the hypotheses, it is of interest to elaborate on additional results collected using the EEG and facial coding. Here, other emotions than positive and negative as well as the aspect of cognitive load are taken into concern. Moreover, the data will be analysed in terms of the four ad categories.

5.3.1 Emotions in Detail

After having discussed the impact of positive and negative facial expressions, it is possible to take a closer look at other emotions shown in the facial coding table, to receive better understanding of which specific emotions have effected memory formation most in the presented study.

	R^2	Joy	Anger	Surprise	Fear	Contempt	Disgust	Sadness	Confusion	Frustration
AMS	0,72	-3,98		12,22				6,82	-2,22	
BMS	0,42	5,23	-2,88	3,30		-12,45	2,59		5,02	-6,07

Figure 30: Effects of Emotions on AMS & BMS

When looking at the table above, surprise is the only emotion that has the same effect on both AMS ($t = 12{,}22; p < 0{,}0001$) and BMS ($t = 3{,}30;\ p\ 0{,}0010$). Surprise occurs when an outcome is unexpected, thereby disconfirming prior expectations (Teixeira, et al., 2012). Based on the presented results it can therefore be concluded that being surprised is a positive attribute for memory formation that can be measured successfully with facial coding regarding both AMS and BMS. This is also supported by Teixeira et al. (2012), who found results on surprise using facial coding to be significant. They further found that surprise is able to concentrate attention, which consequently explains the positive impact on memory. Moreover, they hypothesize that surprise can trigger motivation to engage with content, which would be interesting for future analysis using the collected data.

It is furthermore worth focusing on contempt, which has a very strong negative relationship with BMS ($t = -12{,}45; p < 0{,}0001$). At the same time, contempt is not significant for AMS ($t = 1{,}05; p\ < 0{,}2939$). The findings suggest that when consumers regard an advertisement as mean, vile, or worthless, they tend to not remember the brand, proposing that contempt is not beneficial for memory. This is interesting, as the previous results have shown that negative facial expressions are positively related to BMS, falsifying $H_{4b.}$ This therefore, shows that negative facial expressions are a more complex concept, since the results of negative and contempt are opposing each other. As previously mentioned, current research has not been focusing on investigating negative facial expressions in terms of advertising effectiveness (Teixeira, et al., 2012; Lewinski, 2014). The presented results therefore strengthened the need for future research to gain a better understanding of the impact of negative emotions.

As the table above shows, there are only a few emotions that have a strong effect on either memory score. Besides surprise there is no other emotion that is particularly high for AMS, whereas concerning BMS only contempt has a strong influence. Besides the two discussed emotions sadness ($t = 6{,}82; p < 0{,}0001$) has a positive effect on AMS, whereas both joy ($t = -3{,}98; p < 0{,}0001$)

and confusion ($t = -2{,}22; p < 0{,}0263$) have a slight negative effect. Based on results of BMS, similar findings can be made. Emotions such as joy ($t = 5{,}23; p < 0{,}0001$), confusion ($t = 5{,}02; p < 0{,}0001$), and frustration ($t = -6{,}03; p < 0{,}0001$) have medium strong effects, where all other types of emotions have even weaker influences on brand memory. This makes it difficult to draw valid conclusions based on specific emotions. However, it demonstrated that emotions that fall both under positive and negative emotions can either support or impair memory formation, indicating the complexity of the topic. This finding is also supported by research, showing that other basic emotions such as sadness, anger, surprise, fear, and disgust did not predict advertisement effectiveness (Lewinski, 2014).

Generally speaking, based on the table of emotions one can draw the conclusion that there is no single emotion that has the same effect across categories. This further amplifies the importance of gaining a better understanding of emotional effects. Therefore, the categories will be discussed individually to investigate which emotions are specifically impacting memory formation within the categories.

5.3.2 Cognitive Load

Whilst analysing the data not only have all measured emotions been analysed, but also the concept of cognitive load and what affect it has on ad- and brand memory. As previously mentioned, cognitive load refers to the total amount of mental effort being used in the working memory (Sweller, 1998). It was found that cognitive load is negatively related to brand memory ($t = -11{,}65; p < 0{,}0001$), whilst being extremely positively related to ad memory ($t = 70{,}08; p < 0{,}0001$). This therefore suggests that content that has to be processed sufficiently is negatively influencing brand memory, but has a very positive impact on ad memory. This corresponds with the previous discussed emotion of confusion, which is negatively related to AMS, but positively related to BMS. Therefore, good ad memory is ensured by higher and more successful cognitive load that is not confusing for consumers.

However, even though the effects on BMS are not as strong, content that requires much mental effort seems to be counterproductive. This corresponds to literature stating that higher cognitive load results in poorer recall, since high cognitive load requires the viewer to expend extra memory resources in order to deal with incoming information (Barrouillet, et al., 2007; Ashcraft & Battaglia, 1978). It can thus be assumed that in order to strengthen brand memory, ads should not evoke or require high levels of cognitive load in their content, but instead focus on easy, recognizable factors

that are emotionally relevant. Previous research has also related arousal and valence to cognitive processing. Lang, Dhillon and Dong (1995) suggest that negative stimuli are responded to as survival functions, why processing of these is automatic and requires less cognitive capacity. At the same time arousing positive messages result in increased reaction times. This is an interesting perspective; as this study has not tested the interaction between arousal and cognitive load or the interaction between valence and cognitive load, this should be done in future research.

5.3.3 The Four Ad Categories

The results have shown that AMS and BMS are negatively correlated to each other, which is why the authors find it interesting to investigate more closely how and why they differ. One option is to closer examine the different ad categories. The used stimuli were chosen to ensure a broader set of advertisements in order to see whether the effects diverge or converge across categories. Further, it is assumed that ad content or type of advertising is similar among ads within the same categories. Therefore, emotions should affect memory formation in a similar way within categories. Consequently, analysing effects of emotions within the specific categories will provide more detailed results.

The chosen categories consist of (1) social cause, (2) food, (3) fashion, and (4) fast moving consumer goods. Before discussing the emotional effects within the different categories, they will individually be introduced and the factors they have in common or the factors, which distinguish them, will be described. It must be kept in mind that the described features of the ads are based on the authors' viewing of the stimuli, and can therefore be seen as subjective. The following screenshots illustrate what has been perceived as brand or product exposure, followed by message and ad content exposure.

Figure 31: Brand Exposure

Figure 32: Product Exposure

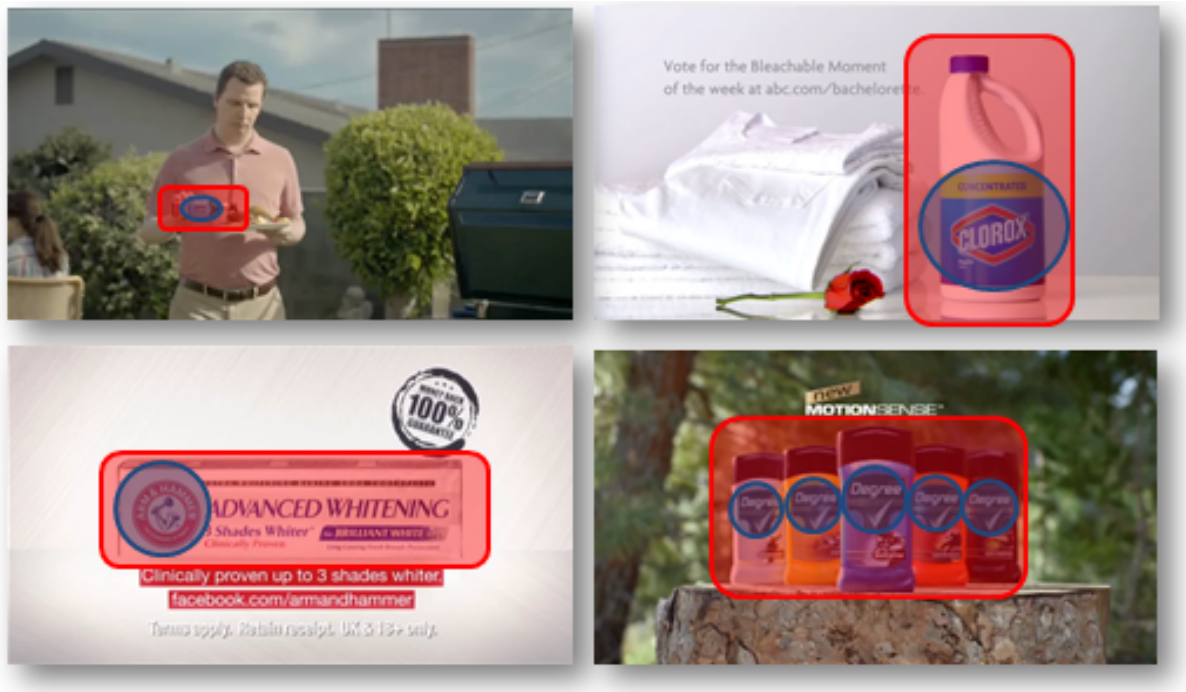


Figure 33: Simultaneous Brand (Blue) and Product (Red) Exposure

Figure 34: Ad Message (Green) and Ad Content (Orange) represented through Faces

Moreover, to compare ad categories, results based on facial coding and EEG from the different categories, which will be discussed in detail in the sub sections. The table below displays an overview of the results.

CATEGORY	FASHION		FMCG		FOOD		SOCIAL CAUSE	
	AMS	BMS	AMS	BMS	AMS	BMS	AMS	BMS
Joy	14,97	-3,02		-2,38	-9,34	2,26		
Anger	-12,5	-5,15	-4,58	6,99	8,77		3,34	-3,07
Surprise	5,5	4,30	-2,22	6,40			-2,25	5,61
Contempt	-4,69	-2,30	-7,51	6,56				-9,18
Disgust	7,16	2,09	4,8	-5,30	5,59		-3,94	
Sadness	7,72	13,56	-6,28	14,01				
Confusion	10,19	-1,97	-3,21	-6,40	-13,14	-14,23	-4,55	4,47
Frustration			-3,25	3,81	-2,02		-4,79	-4,60
Neutral	-4,21	4,36		7,35	-4,91		2,73	-4,42
Positive	-22,99	18,10	-3,02	8,33	13,47		2,02	
Motivation	5,3	2,61	4,84	-2,94	-11,77	-2,83	-3,99	2,88
Arousal	3	4,31	3,46	6,36		4,14		-2,44
Distraction	-5,7	-16,19	1,99	3,88	5,09	-3,09		
Cognitive Load	-7,3					2,33	9,02	-7,69
model R^2	**0,6776**	**0,7530**	**0,8745**	**0,9065**	**0,8927**	**0,9340**	**0,7488**	**0,7735**

Table 4: AMS and BMS Analysis for Ad Categories

Before discussing the different categories in detail, the general prediction power (R^2) of the AMS and BMS analysis including the different ad categories should be discussed. In the last row of the table it is possible to see that all R^2's are above 60%, and looking at the BMS prediction power some are even above 90%. This can be compared to the earlier introduced general models predicting solely BMS and AMS, with a R^2 of 42% and 72% respectively. It is possible to conclude that especially for predicting BMS it is relevant to look at specific category results. However,

interesting enough the prediction power for AMS does not increase as much. This indicates that BMS is a much more complex score, where more detailed information is needed to receive a profound understanding. Here, category-specific elements seem to play a role when analysing the relationship between emotions and brand memory. At the same time, looking at general emotions for AMS seems already to provide relatively stable results.

5.3.3.1 Fashion

Concerning the fashion category, one can notice that they usually do not have a speaker. They do however, all have product placement of fashion items throughout the whole ad. At the same time, the viewer is not always aware of the items shown being fashion products, hence the consumer needs to be familiar with the brand beforehand or will need to learn during the ad, that it deals with fashion items. Therefore, the fashion category might also risk misguiding costumers that do not know the brand or realize that it is a fashion ad. Moreover, the brand logo exposure is usually very short, from 2-5 seconds, and typical at the end of the ad. Fashion ads also tend to create a feeling or mood usually using music to support this, rather than having a clear message or story, being conveyed.

Looking at the results of the fashion category, the strongest effects for both AMS and BMS are positive facial expressions, being negatively related to AMS ($t = -22{,}99$) and positively related to BMS ($t = 18{,}10$), indicating that this is a crucial emotion for the fashion category. Interestingly, confusion ($t = 10{,}19$) has a strong positive effect on ad memory. When looking at the survey results, it becomes obvious that for the fashion ads, participants had difficulty relating a watched ad to the right category. This demonstrates that even though participants were confused about the product category, they still remembered the ad. However, confusion ($t = -1{,}97$) is slightly negatively related to brand memory and should therefore not be seen as a desirable goal. Moreover, sadness ($t = 13{,}56$) has a strong positive effect to brand memory. Since positive facial expressions also have a strong positive effect, this could indicate that commercials playing on emotions triggering both sad- and positive emotions might work well.

Looking at cognitive load, it is negatively impacting AMS ($t = -7{,}3$), whilst not impacting BMS, further strengthening the argument that fashion ads tend to focus on conveying a mood, rather than a more challenging message. Taking into consideration that fashion has the highest BMS score across all categories, but the lowest AMS score, it is fair to assume that generally cognitive load is not a beneficial factor for the fashion category.

5.3.3.2 Fast Moving Consumer Goods

Fast moving consumer goods ads are mostly based on humour, with very little duration of message exposure. Humour can be defined in different ways, where the authors have categorized a humorous stimulus as an ad provoking at least a smile, and/or leading to a certain degree of amusement. Moreover, instead of long message exposure, FMCG ads seem to focus on product placement, where the ads always clearly state and show the product in the start and end of the advertisement. Further, all ads have an audio speaker throughout the ad.

A closer analysis of the FMCG category shows, that both motivation ($t = 4{,}84$) and arousal ($t = 3{,}46$) are positively related to AMS, while motivation ($t = -2{,}94$) is negatively and arousal ($t = 6{,}36$) positively related to BMS. This seems to make sense, as it is possible to assume that humour can trigger arousal. Generally the scores are not very high, thereby making it difficult to draw valid conclusions. Concerning AMS, all other emotions also have relatively similar scores, some being positive and some being negative, therefore it is not possible to name emotions that seem to be particularly important. For BMS, sadness ($t = 14{,}01$) is the only emotion that has a stronger effect on brand memory. Generally, having many emotions that show a significant – but not very strong – effect indicates that it might be helpful to further analyse the data based on the individual ads rather than at a category level for FMCG. Taking into consideration that the ads from the FMCG category are very diverse, differentiated in terms of for instance product type or target group, it seems reasonable to conclude that it is difficult to find specific emotions that have similar effects across all ads.

Cognitive load has no effect on AMS or BMS, indicating that the FMCG commercials used in the experiment fail to trigger cognitive engagement. This resembles the idea that most FMCG ads avoid conveying complex messages, and rather use a sense of humour throughout the ad to present the product. Taking into consideration that the category has the highest AMS, whilst also having the lowest BMS, it appears that the FMCG category is good example of the creative magnifier concept (Millward Brown Lansdowne, 2005), using different emotions and creative devices to increase AMS, but failing to create strong brand memory. As such, that the ad content seems to cannibalize on brand memory formation.

5.3.3.3 Food

Advertisements in the food category all tend to have a speaker, and are using product placement and/or related ingredients following logo exposure throughout the whole ad. Furthermore, it is very clear to the consumer when they are watching food ads, since the product is very distinct and is usually the focal topic of each ad.

Concerning emotional effects in the food category, motivation has a strong negative relation with AMS ($t = -11{,}77$) and similarly a negative effect on BMS ($t = -2{,}83$). This is a surprising finding, as it could be assumed that feeling hungry would lead to higher motivation, thereby supposing that higher motivation would lead to better memory. Here it would therefore be interesting to further investigate how hunger as specific motivational trigger affects the food category. Furthermore, it is striking that many of the facial expressions seem to have no effect on memory within the food category. However, positive ($t = 13{,}47$) facial expression seems to positively affect AMS while confusion ($t_{AMS} = -13{,}14$; $t_{BMS} = -14{,}23$) has a strong negative effect on memory formation for both the ad, as well as the brand. Additionally, confusion ($t = -14{,}23$) and joy ($t = 2{,}26$) are the only emotions significant for predicting BMS. An important point is that the food category's R^2 for BMS has the overall highest score with 93% prediction strength. It can therefore be concluded, that the findings strongly support the assumption that consumers appreciate commercials that clearly state the benefits of the food, whilst excluding complex statements.

Moreover, cognitive load has no impact on AMS and only a small positive impact on BMS ($t = 2{,}33$). These results tend to suggest that cognitive load does not play any significant role for the ad. However, based on the before findings about confusion being very negatively related to both AMS and BMS, it can be assumed that high cognitive involvement might not be beneficial for food commercials. Shorter, more logical storylines are therefore recommended.

5.3.3.4 Social Cause

The used social cause ads all tend to use a storytelling technique, communicating a message that is not necessarily centred on the brand, but rather the cause, while a speaker usually tells the story. Common to all of them is that at the end of the ad the ad message appears in written form, usually shown in a period between 3-13 seconds. Furthermore, the category commonly has a brand logo exposure of very short duration, usually between 2-5 seconds placed at the very end of the ad.

When looking at the emotional responses, the social cause ads do not indicate very strong differences among them. For AMS all emotion scores are between $-4{,}79$ and $3{,}34$ indicating that no emotion has a particular strong effect. Concerning BMS, contempt ($t = -9{,}18$) can be mentioned, being negatively related to brand memory, thereby suggesting that when watching social cause ads, consumers should not feel contempt. This is interesting, because social ads score high on AMS, while low on BMS. Typically, social cause ads play with negative feelings in order to increase willingness to contribute to the cause. However, this does not seem to be beneficial for brand memory.

Cognitive load effects are relatively high for both AMS and BMS, being positively related to AMS ($t = 9{,}02$), while being negatively related to brand memory ($t = -7{,}69$). This indicates that even though participants engage in the ad message and thereby remember the ad, it does not seem to be supportive of brand memory. This is further supported by the fact, that AMS is compared to the other categories relatively high, while social causes score relatively low on BMS. It is discussable whether it's more important for social cause advertisements to make a valid point about the cause, rather than communicate the actual facilitator of the ad. At the same time, one would assume even though the cause itself is very important, that companies producing the ads would want donations to their specific brand, why the fact that the brand is negatively related to cognitive load must be taken into consideration. Here one can also refer to the research of Lang, Dhillon and Dong (1995) having demonstrated that negative messages provoke faster reaction times. At the same time they have also shown that even though arousing negative messages are receiving less processing capacity, they are still remembered better than calm messages. This can be supported by current findings, as social cause ads usually use negative messages and the category scored very high on ad memory. Here it should however be noted that the interaction between arousal and cognitive load should be investigated more closely. At the same time, it can be assumed that brands are especially in this context perceived as peripheral content, which could be one explanation for low brand memory. Moreover, the brand logo was typically only shown in the very end of the ad, which might further cause low scores of brand memory.

5.3.3.5 Emotional Effects Differ Across Categories

The most striking finding based on the above discussion for the ad categories is that BMS and AMS contrast each other. The categorization of the ads has shown that not all results previously discussed on a general level hold true for all categories Looking at for instance only positive facial

expressions, as previously defined within the hypotheses of this paper, it appears that even though it was generally found that positive facial expressions have a positive impact on AMS and a negative impact on BMS, positive facial expressions have a negative effect on AMS for fashion and FMCG, whilst being positively related to food and social causes. When looking at the results for BMS, it is noticeable that the fashion and FMCG categories' results are reverse to AMS results, with positive facial expressions being positively related to BMS, whereas they do not have any effect on food and social cause ads. This contrast demonstrates that the two memory scores are fundamentally different, and an ad that generates a high ad memory score, will not necessarily provide a high brand memory.

Moreover, the previous discussion has shown that various emotions have significantly different effects on the categories, where no single emotion has the same effect across all categories. Taken together with the fact that results based on the categories differ from the overall results this differentiated discussion demonstrates the complexity of the topic, implying the challenge of understanding the role of emotions in advertising. As the categorization of the ads has demonstrated strong difference among the ads exist. Thereby, emotions also have different effects on memory, making it not possible to provide one solution for all ads to achieve high advertising effectiveness and a strong brand memory.

5.4 Explorative Analysis of the Survey Results

After having discussed how the tested emotions affect brand and ad memory formation within the different categories, further results collected in the survey are also examined. It should be noted again, that AMS and BMS are artificial scores that have been established based on the collected survey result. Within the score, different memory tests such as recall and recognition have been combined. Therefore, it is interesting to look at individual results of several survey questions to gain a better understanding of different aspects such as the different associations participants wrote down, when seeing screen shots of the ads the or whether participants were able to relate ads to the right product category. Here it is tested if consumers not only remembered the brand or ad, but whether they also understood what the ad was for. Moreover, it can be discussed how ad likeability relates to brand and ad memory.

5.4.1 Positive, Negative and Factual Associations

As previously mentioned, BMS and AMS have been generated based on different recall and recognition tasks in the post-experiment survey. However, after seeing screenshots of the watched ads, participants were asked to write down associations they had towards the ad. These associations have not been included in the memory score, due to the fact that the Top-of-Mind associations collected in the beginning of the survey were perceived more valuable, based on the NeuroBattery introduced by Ramsøy (2014). However, it is still interesting to analyse the collected associations, as research has shown that the number of associations evoked by a brand can be used to evaluate brand equity and brand memory (Keller, 2001). It has further been noticed that consumers store a wide variety of associations in memory, some positive and others negative (Krishnan, 1996). Therefore, associations should rather be classify than considered on an aggregated level. This is further supported by Keller (1993) stating that to create brand equity, it is not only important to create many associations, but also associate the brand to positive attributes. Therefore, the collected associations have been categorized into positive, negative, and factual associations. It should be noted that the process of classifying associations can be considered a subject process, but the authors completed the task in a coherent manner. The results can be seen in in the results section 4.1.5.

Looking at the number of associations while taking memory scores into consideration, fashion ads do not only have the highest amount of positive associations, but also the strongest brand memory. The food category shows similar results, being the second highest for the BMS score and also having a high number of positive associations. Regarding social cause ads it should be noticed that it is a special case, due to the fact, that social causes tend to have a negative, sad messages. Therefore, it is not surprising that the category received a much higher number of negative associations. As social cause ads still have the highest score on ad likeability, it might be assumed that the participants did not perceive the ads as negative in general, but rather observed the message as being negative. The previous findings suggest that a high number of positive associations lead to strong brand memory. Therefore, the authors have correlated the number of associations with memory scores, the results can be seen in section 4.1.5.

The figure supports the assumption that more positive associations lead to better brand memory, the same holds true for the total number of associations, therefore it can also be said that the more associations participants have formed, the better brand memory. At the same time this does not hold

true for ad memory, where more associations are correlated to weaker ad memory and the same holds true for more positive associations being negatively correlated to ad memory. The presented findings are further supported by Krishnan (1996), who points out in his research that it is desirable for a strong brand to focus on consistently achieving net positive associations. Taking into consideration that this will also lead to better brand memory, ads should be optimized to increase positive brand associations. However, it should be noted here that the ads used in the present study were unknown. Especially for the topic of associations it is important to consider, whether consumers have prior knowledge of a brand or not. Therefore, the presented findings would possibly differ when using known brands.

5.4.2 Connecting Ads to the Right Category and Brand

To further analyse the findings, an interesting aspect is to look at whether participants were able to relate a shown ad to the right category and the right brand. This is important as consumers most likely do not make brand decisions while being exposed to an ad, but when being at the point of sale, where consequently the recall of the advertising message influences the decision (Mehta & Purvis, 2006). In the survey participants were able to see screenshots of the previously watched ads and were then asked to match the ads to the right product category and the right brand giving them different options to choose from. The corresponding graphs can be seen in the results sections 4.1.2 and 4.1.3 showing the percentage of participants that were able to answer correctly.

Regarding the task to associate ads with the right category, the results are relatively high, namely over 90%. This is likely due to seeing screenshots of the ads, while having to assign the product category is a fairly easy task. Concerning, the task to match watched ads to the advertised brands, the results are generally lower, ranging from 49% to 82%, which is likely due to the fact that linking the brand to the ad is a slightly more difficult task. In the following, results will be discussed based on the ad categories, where BMS and AMS for the categories will also be taken into account.

When looking at the results for the **fashion** category, the category scores high on associating the right brand to the ad, and has the highest BMS of all categories. However, fashion has the lowest AMS, while also having the lowest score on associating the right ad to the category. This indicates that even though fashion ads perform well on forming brand memories, they do not perform very well in explaining the product category, nor do they create strong ad memories. This is an interesting finding. In the study relatively unknown ads have been used, if one assumes that the

fashion brands would have been know, it would not be an issued that participants were not able to associate the ad to the right category, for new brands this is however crucial.

The **FMCG** results demonstrate once again that AMS should not be the ultimate goal for marketers. While the category scores highest for AMS (90%), it has the lowest score for BMS (39%), as well as scores poorest in the category- and brand association tasks. Thus, participates were able to recall the ad, but did not remember the brand, nor were they able to associate the right brand or category to the ad. This is an interesting observation, as it demonstrates that FMCG ads were able to trigger strong ad memory. However it is easy to notice that an ad cannot be perceived as effective, if consumers do not understand what the ad is for, nor have they learned something about the brand.

The **food** category is among the best in all task and memory scores except AMS. This means that participants were able to recall the advertised brand and were also able to correctly associate a watched ad with the category and brand. However, concerning AMS, the food category has, after fashion, the lowest score. Following the argumentation of the authors, this category is therefore optimizing brand memory formation, meaning that there must be significant aspects to learn from these ads. Characteristics from the food category that might be connected to the high brand memory score could be factors such as the ads only triggering a very limited amount of facial expressions. Moreover, the ad instead tends to yet drive attention by using the shown products throughout the ad. When going back to the previous emotion analysis, the food category also had the best prediction rate using the EGG and facial coding to predict memory scores. This could once again be due to the fact, that the emotional responses from the food category ads are not as complicated, as with other very categories triggering a variety of different emotions.

Analysing the results of **social cause** ads, it is possible to say that the results are relatively similar to the FMCG results. While having strong AMS scores, the BMS, category, and brand associations are low. Whether the importance of strong brand memory is as strong in the social cause category, as the other categories, has been discussed. Social cause ads tend to focus on educating consumers about a specific cause, rather than the brand executing the advertisement. However, the analysis has shown that social cause ads also scored relatively low on the category association task, implicating that participants were not always certain what the ad was about, which should be taken into consideration, as it is a negative outcome.

5.4.3 Discussing Ad Likeability

After having discussed participants' ability to match the watched ads with the correct category and brand it is also interesting to look at ad likeability.

As previously shown, ad likeability is considered important for memory formation. Research shows that ad likeability is a good predictor of memory and ad success (Du Plessis, 2005; De Pelsmacker, et al., 2010). After watching the ads participants were therefore asked to rate the ads on likeability score, results can be seen in section 4.1.4. The scores are generally not very high; ranging from 4,2 to 5,8 on a scale of 0-10. However, variations across categories are noticed, where social cause (5,8) ads have the highest ad likeability score, whilst fashion (4,2) ads have the lowest. Categories of FMCG (4,8) and food (4,6) are relatively similar, although not much higher than the fashion category. Comparing ad-liking scores with AMS and BMS of the categories, it has been noticed that the fashion category scores lowest on ad liking and AMS while having the highest BMS. The authors found this quite interesting and therefore correlated the memory scores to ad likeability. The corresponding graph can be found in section 4.1.4.

As shown in the graph, based on the results of this study, increased ad likeability leads to higher AMS. However, the opposite holds true for BMS, where the higher ad likeability, the lower is BMS. Similar results have been found by a study of iMotions (2013) comparing two advertisings. Verifying results from this study, iMotions also demonstrated that the more participants liked an ad, the lower it scored on brand memory. Using an eye-tracker the study demonstrated that participants spend longer time looking at the content of the ad rather than the brand, when ad likeability was high.

Yet again the previous supports that marketers' main focus should be on creating strong brand memory, rather than ad memory. However, the authors are not proposing to create ads that are not liked, but rather emphasise the importance of integrating the brand into what consumers like about an ad. Moreover, the discussion supports the previously mentioned critique by Bergkvist and Rossiter (2008) of using ad likeability as a measure for ad effectiveness. Their study has shown that ad likeability failed to predict brand communication effects, which is similar to the presented results. Therefore, they recommend using brand-based measures, such as measuring brand believes and attitude about the brand, which can be supported by current findings.

5.4.4 Conclusion on Explorative Analysis

The previous discussion of collected survey results has shown that more traditional marketing concepts such as associations, recognition and ad likeability still provides valuable insights. Thereby, it is reasonable to argue that the traditional self-reported measurements can successfully be supported by neuroscientific research approach. Concerning associations it has been shown that positive associations are positively related to brand memory. This provides ground for future research, to investigate how positive facial emotions and positive associations are related to this as they have shown opposing results. The discussion of category and brand classifications has again shown that there are critical differences among ad categories. Furthermore, results of ad likeability strengthened the argument presented throughout the paper that emotions need to be triggered by elements that are related to the brand to ensure brand memory.

5.5 Key Findings: Answering the Research Question

The above discussion has shown that the study with 103 participants testing their emotional reactions with EGG and facial coding based on testing 16 ads has generated interesting findings. In order to provide a good overview, the following table summarizes the key findings:

AMS / BMS
→ AMS is fundamentally different from BMS
→ AMS and BMS are negatively correlated
NEUROSCIENCE TOOLS: EEG & FACIAL CODING
→ Very beneficial in predicating memory
→ EEG and facial coding are better at predicting ad memory than brand memory
AROUSAL & MOTIVATION
→ Arousal is negatively impacting memory formation
→ Motivation has either a positive or no impact on memory formation
FACIAL EXPRESSIONS
→ Facial expressions are a complex matter
→ Positive emotions lead to negative brand memory, but to positive ad memory
→ Negative emotions lead to better brand memory
EXPLORATORY RESEARCH
→ Categorization of the ads lead to more in depth findings
→ Emotions and memory formation differ across ad categories
→ Cognitive load has an extremely strong positive effect on ad memory
→ Cognitive load has a strong negative effect on brand memory

The overall research was inspired by very creative ads such as the Evian ad and the question if too much creativity can actually impair memory formation. Thereby, the **research question** *"How do ad-induced emotions affect the viewer's memory formation towards the ad, the advertised brand, and the linkage between the two?*" was formulated. As the previous literature review has shown, brand memory is considered more important than ad memory. This is due to the fact that being exposed to the brand usually triggers purchase decisions, while the ad itself does not trigger a

decisions during exposure (Mehta & Purvis, 2006). Therefore, strong, unique, and favourable brand memories should be formed that consumers easily retrieve before or during the purchase (Steidl, 2014).

After having tested the defined hypotheses and outlined resulting key findings, the research question can be answered. First, the relationship between ad memory and brand memory should be outlined. As the discussion of AMS and BMS has shown, the two memory scores are not at all the same. They are essentially negatively correlated, where increased ad memory, will lead to lower brand memory. Therefore, it is also crucial to distinguish between emotional effects on brand versus ad memory. Results have shown that different emotions impact the two scores differently, demonstrating the complexity of the topic. At the same time, arousal has been shown to negatively impact brand and ad memory. This is contracting past research, but might be due to the research design. Thereby, further research might be necessary to gain better insights. Moreover, facial expressions also have provided mixed results. Positive emotions lead to better ad memory, but lower brand memory, whereas negative emotions support brand memory. Overall, it has therefore been shown that ad-induced emotions play a crucial factor in memory formation of advertising stimuli. Having shown that positive emotions can impair brand memory formation supports the general idea of this research. Marketers should therefore, not only focus on creating creative ads, that consumers like and share, but need to keep the bigger picture in mind.

Part 6: Limitations

After having discussed the main results of this study and summarised key findings, possible limitations of the presented research will be discussed. Acknowledgment of limitations requires an interpretation of the meaning and influence of errors and validity problems on this paper's findings. This goes beyond listing the magnitude and direction of random and systematic errors and validity problems (Ioannidis, 2007). Without detailed limitations, one would be facing an important loss of context for the scientific literature. The following section will therefore discuss the different limitations and the evaluation of the experiment quality.

6.1 Validity

Validity refers to the extent in which a concept, conclusion, or measurement is well-founded and corresponds accurately to the real world (Zikmund, et al., 2003). Therefore, validity of a measurement tool is considered to be the degree to which the tool measures what it claims to measure. Ignoring basic methodological principles, such as validity, can lead to poorly designed research and misleading conclusions. Therefore, the following sections will discuss how data has been handled and reported, to increase disclosure thereby strengthening validity.

6.1.1 Control of the Experiment Environment

The experiment was conducted in an artificial controlled laboratory environment, giving the authors the possibility of controlling the research setting, as well as extraneous factors, such as lighting conditions, and noises (Zikmund, et al., 2003). For this purpose, the experiment guidance by iMotions (iMotions Global, 2014) was followed.

However, even though laboratory experiment has a higher internal validity, it has a limited external validity (Bryman & Bell, 2011). Field experiments can create a higher level of realism, as they are conducted in the natural setting. Here consumers would normally be affected by the social situation (Percy & Rosenbaum-Elliott, 2012), as well as the subject's home environment, such as music background and comfortable seating. However, it is not possible to conduct a field experiment due delicateness of the used neuroscience tools, which therefore may lead to misleading results. Furthermore, the EEG measurement is very sensitive and therefore calls for strict extraneous factors control. Nevertheless, retesting of the main effects of brand on preferences in real-life situations is highly encouraged, why two distraction screens were set up next to the stimuli in attempt to create the right environment as possible.

Furthermore, Bergkvist and Rossiter (2008) have stated that academic advertising experiments should be designed to be more realistic by using multiple exposures of the ad, as in a campaign, and delayed measurement of brand communication effects. However, Burke and Srull (1988) found that ad repetition increases recall when no competitive ads, i.e. ads in the same category, are present, but did not increase recall when the ad was presented in the context for ads of the same product category. Thus, higher levels of ad exposure may not significantly strengthen the link in the ad memory trace, why the authors find it valid to only show the participant's the different ads once, as long as they are presented together with other ads of the same product category.

6.1.2 Reverse Inference and Bivalence

These two factors are important to take into account, since research is still far from having a complete understanding of the human brain.

Reverse inference is a logic fallacy. It is not wrong in itself; it merely assumes that one knows everything there is to know about a subject (Ramsøy, 2014). When prior research is used to draw conclusions of current findings, mistakes might be made. Functional brain imaging research is relatively new; hence, one cannot make reliable claims about which brain functions are related to or influence by each other. A study based on consumers loving their IPhones can be used as an example of reverse inference (Lindstrøm, 2011). Poldrack (2011) states that even though the insular cortex is associated with feelings of love and compassion it does not prove that consumers are in love with their iPhones. Since other studies also show that the insular in general is one of the most highly activated parts of the brain (Yarkoni, et al., 2011) and that activation in the insula isn't necessarily related to love, but instead is a classic reward system area (Fisher, et al., 2010).

Further, it should be noted that bivalence could cause difficulties in an analysis. Bivalence states that every declarative sentence expressing a proposition of a theory has exactly one value; either true or false. If something is bivalence it hence causes the problem of not knowing whether a response is due to positive or negative reaction.

The two above concepts have been taken into account during this paper, and will be further discussed in the next section.

6.1.3 Possible Measurement Effects

The field of neuromarketing in itself has raised criticism due to several reasons. It is often the controversy of trespassing into the mind of consumers and gaining consumer insight (Rick, 2010). Though, an important point is the questioning validity and reliability. Therefore, based on the various neuroscience tools implemented to the study, the validity of the different measurement effects will be discussed.

Many studies show that the facial expressions method needs more validation than has currently been offered. This is not to say that facial coding is invalid, but that with the current interest seen especially in commercial neuromarketing, validity must be addressed in more detail before it can be used in full scale (Genco, et al., 2013). Therefore, a few factors were taken into consideration by the authors. First, based on internal validity, it was made sure how reliable the measurement is, and

how the error rate has decreased significantly in the past ten years (Crawford, 2011). Additionally, construct validity was taken into consideration by researching to what extent the facial expressions measurement could reliably measure different types of emotional responses. The iMotions tool can assess the seven basic emotions built on Paul Ekman's theory (Ekman & Friesen, 1978; iMotions Global, 2014). However, the researchers found a small number of problems, when addressing external validity. The tool did not seem to assess all actual emotions properly, since participants that were either yawning or coughing were registered as being "surprised". This problem was taken into account by closely observing each participant's data during the experiment, whilst noting possible outcomes down (Ekman, et al., 1971). Lastly, it has been noted that different studies have shown that facial expressions are not a strong predictor of consumer behaviour and thereby not valid in itself. Hence, the authors have supplemented the results with multiple other measures to increase strength of the results (Bryman & Bell, 2011).

Regarding the EEG, it is of importance to mention the notion of reverse inference. If one had a perfect understanding of the brain, reverse inference would be legitimate. Finding one particular brain response related to a mental operation would then indeed be indicative of the mental operation (Ramsøy, 2014). However, as it is not possible to read people's thoughts but it is only possible to measure biological responses in the brain, one cannot draw such conclusions. Therefore, to address reverse inference, the authors have implemented an experimental design and data analysis that allow capturing the cognitive and emotional responses of the mental process of interest directly. Additionally, each participant had to conduct a calibration before the experiment providing the baseline for the EEG, making sure that the researchers are analysing correctly. During calibration participants were shown factors that triggered responses, and therefore guarantee that the measurements are consistent with the predicted response.

Additionally, it is mentioned that many measures are bivalent, which is a problem of neuroscience tools (Peters, 2013). However, the issue is addressed in this paper by adding additional measures to the study. Therefore, this study has combined different tools to increase validity, arguing that if various tools show similar results, one can be more certain that they are true. Moreover, to support the neuroscience measure, a questionnaire has been added. It is therefore also crucial when measuring emotions to combine measurements to increase validity with for instance questionnaires and facial coding. The questionnaire was used to increase validity in different ways. First, it addresses bivalence, as here participants were given the opportunity to express what they found to

be positive or negative. Second, participants had to do distraction tasks for 20 minutes, before they answered the questionnaire. This ensured that results could be rated as long-term memory. However, the rating was applied as consistently as possible to increase strength of the results. To further improve validity, the use of two quality control sections were implied in the questionnaire by giving the participants screenshots of two advertisements they had not seen during the stimuli (Phillips, 2013). In both control ads, 80% said that they definitely had not seen the advertisement before, and the remaining 20% said that they were very uncertain that they hadn't seen them, therefore increasing validity.

Finally, rating the questionnaire data was done somewhat subjectively, since the authors had to base categorisation on own personal judgement. However, to increase validity, rating was applied consistently in the data.

6.1.4 Possible Effects of Respondents

Concerning validly it should also be noted that participants could influence the results. Therefore different effects will briefly be discussed.

The "demand effect" reflects the fact that during the experiment procedure participants may be unintentionally affected by the clues about the hypotheses and research objectives. If participants understand the purpose of the experiment, they may bias their answers by responding to the question in what they would consider a right way (Zikmund, et al., 2003). In this case it could potentially have affected the validity of the results, if participants knew the purpose of the experiment before viewing the stimuli, and therefore paying extra attention to the brand and recalling this.

The "Hawhorne effect" suggests that subjects may act and respond differently when knowing they are the participants of an experiment (Zikmund, et al., 2003). This is also a social effect that could have an effect on the measurement of facial expressions. Therefore, it was necessary to be aware of that facial expressions are affected by the social context in which they are measured, such as whether the participants are together with other people, or whether they are conscious about being observed (Genco, et al., 2013).

Last, the "experimenter effect" should be mentioned. Here, it was taken into account that the participants could change their answers if they noticed the researcher unintentionally signalling the right answer, by for instance smiling. The researchers took these effects into account by preparing

and following a guideline of the testing procedure during the study (Zikmund, et al., 2003). All subjects were treated in the same manner. During recruitment process participants were not fully informed about the purpose of the experiment. Participants were rather invited to participate in a documentary study conducted with various neuroscience tools. Only after the experiment participants were informed that the ads were actually the focal part of the study. Further, the researchers were aware to not interact with the participants during the experiment (Pole & Lampard, 2002). As mentioned before, two other master students were also conducting experiments for the project, why a strict rule set was followed to ensure that valid data was produced consistently. Moreover, subjects were tested individually and were asked to not give out the information about the experiment procedure to other potential participants.

Lastly, to ensure that participants were not aware and not consciously affected by the brand names during the presentation of the stimuli, they were asked to report whether they knew what the test was about, and how much they felt they had been affected by the advertisements: "*What do you think the test was about?*" and "*In the test, you saw some ads: How much do you think you were affected by them?*". Based on the results, 86% of the participants were incorrect about the purpose of the test, whilst the remaining 14% assumed that the study was testing the advertisements, instead of the documentaries, but did not write anything more specific. Based on the average rating of whether or not they felt affected by the ads, responses were in the middle at 5, were the scale was from 1-10; from not affected at all to very affected.

6.1.5 Validity of Selected Advertisements

The advertisements used for the experiment were real ads for real brands, but not available in Denmark, due to avoidance of brand recognition and therefore brand perception. The ads were all retrieved from American websites, and an informal check was made to verify that the brands had never been available in Denmark. To ensure, that the advertisements and brands were relatively unknown throughout the participants, the last section of the questionnaire asked participants to "*Please specify below which brands you knew about before this experiment*". The results found that 43% knew none of the brands before the experiment, 29% knew one brand, 13% two, 6% three, and 9% knew four or more brands beforehand. Therefore, the brands used in the stimuli where unknown to a majority of the participants. The rest of the participants who knew about the brands beforehand could have affected the results slightly. However, it can be argued that the trend is still strong, based on the majority of the participants where the stimulus was unknown.

The ads were all around 30 seconds, the shortest being 22 seconds and longest 44 seconds, to increase similar duration amongst the ads. This has been done, as studies have shown that there is a positive relationship between looking at a product and buying it. Therefore, the longer the subject would be exposed to the advertisement and product, the more likely they would remember it (De Pelsmacker, et al., 2010; Percy & Rosenbaum-Elliott, 2012). Whilst taking the length of the advertisement into consideration, it is also crucial to mention the difference in how much the speaker talks about the brand, as well as product placement. This distribution of the different advertisements is shown in appendix 11.3. Here one can for example notice that some ads show the brand during the entire ad, whereas others only show the logo in the very end. This of course can influence brand memory, as the exposure to the brand is very different.

Further, it must be mentioned, that in a few of the social cause ads, the brand logo shown in the questionnaire was not exactly the same as the brand logo shown in the advertisement. In the questionnaire the actual logos have been used to increase accuracy to the real world. Studies show that good recall performance depends on the similarity of information provided as input and cues (Keller, 1987). Therefore, if misleading results were produced due to the variation in logos, this would be the brand's responsibility, failing to understand the importance of achieving clarity through consistency by using the same brand traces, such as logos, throughout campaigns.

To certify randomization and arrangement of the presented stimuli, the iMotions tool was set to randomize the order of ads in between the two documentaries.

6.1.6 Representation of the Sample Population

One of the most important goals of quantitative research is being able to generalize based on the results. Based on this study's purposes, a probability sampling method was found suitable, rather than nonprobability sampling. This is due to various factors such as data for the whole population cannot be collected, statistical inferences must be made from the sample, and there's a suitable sampling frame available (Trochim, 2006). A suitable sampling frame is therefore that the results should be restricted to the sample population age range, from 18-35 years old with nearly equal amount of males as females. This age range is to narrow down the target group, so they all have fairly similar lifestyle (TNS Gallup, 2013). Further, it should be noticed, that only one participant was native in English, where all others had it as a second language. This could have caused problems, if participants had problems to understand the ads, further the questionnaire was also in

English. This was taken into consideration by stating to the participants beforehand that everything was in English, and that they therefore needed to feel comfortable reading and hearing English.

One of the key concerns towards applying neuroscience to projects is the small sample size. In traditional methods, such as surveys, interviews and even focus groups, the number of subjects tested can go up to hundreds or thousands, being a much larger sample than this experiment's 103 participants. However, even with this small sample, the criticism towards applied neuroscience on sample size is erroneous. In several neuroscience studies, it has been found that studies using very small samples with neuroscience measures can predict both valid and representative behaviour (Dmochowski, et al., 2014; Berns & Moore, 2012). Additionally, when using EEG, each electrode samples the signal with a millisecond resolution. This signal is then divided into several frequencies, for instance alpha, beta, delta, gamma, and theta, why a single person can contribute with a magnitude of data, with 60 million data points or more per person. By merely contrasting the data load of traditional methods and applied neuroscience, it is therefore shown, that there should be no criticism based on this point (Ramsøy, 2014).

6.2 Reliability

The concept of reliability covers the consistency of a measurement. Reliability therefore refers to the repeatability of the experiment meaning that if the experiment would be conducted again, it would show the same or very similar results (Zikmund, et al., 2003). Considering the nature of data collection techniques using EEG and facial expressions, there is a high possibility that the outcome would vary each time the experiment would be replicated and conducted with the same sample population as well as a new one. Whether the result differs and to what degree depends on the participant's physiological conditions, their mood, and their food or caffeine intake during the day (Holmqvist, et al., 2011). Sleep deprivation could make the respondents not pay enough attention to the stimuli, participant's mood would have an emotional bias on judgement, neuro disorders possess certain differences in attention bias as well as in brain activity, and hungry participants would focus more on food rather than clothing, therefore bias towards specific ad categories were used in the stimuli.

Moreover, taken into account the fact that memories are built continuously, if the experiment would be repeated in the long run with the same individuals, brand effects may differ. However, if the experiment would be conducted with a new set of individuals it is assumed that the general results of the experiment would be very similar (Zikmund, et al., 2003).

6.3 Sensitivity

Based on Zikmund and colleagues (2003, p. 304) "*Sensitivity refers to an instrument's ability to accurately measure variability in stimuli or responses*". Sensitivity therefore refers to numerous items on a scale, such as "strongly agree", "slightly agree", and "neither agree nor disagree" etc. Rating scales are the most common approach used for attitude and behaviour measurements among scholars. Likert scales, semantic differential scales, and behaviour intention scales are usually applied in market research (Hair, et al., 2009; Brace, 2008). However, every one of them has a downside of proposing specific classified rating weight that may frame the subjective answer of the participant. For instance, the Likert scale is usually designed to examine the agreement and disagreement with the specific statement expressed through five-point, seven-point, and free-choice format dimensions (Brace, 2008). Scales are applied in the questionnaire given after the experiment.

Part 7: General Discussion

As the literature review has demonstrated, brand memory is crucial for advertising effectiveness, as virtually all brand choices are at least partially memory-based (Walvis, 2007). However, this seems often to be forgotten by marketers. This leads to findings that show more than half of the time, consumers are not able to recall the advertised brand, when recalling an ad (Du Plessis, 2005). Moreover, the importance of emotions in today's advertising has been confirmed, which is why the objective of the presented study has been to gain a better understanding of how ad-induced emotions affect the viewer's ad- and brand memory formation. Thereby it provides a better understanding of brand memory, and how this knowledge can be used to improve advertising. Traditional research has often been criticized for focusing on cognitive-based models and self-reported measurements (Genco, et al., 2013), why neuromarketing and its tools have been introduced. The current study has further used these tools, such as the EGG and facial coding to measure ad-induced emotions and their relation to memory formation. Having integrated existing marketing theories with different concepts such as emotions and memory and adding on to recent neuromarketing insights, this study is of academic and practical significance. The following will therefore summarize academic as well as managerial implications of the presented study.

7.1 Academic Implications

Based on the presented research some general academic implications can be drawn that support and initiate further research in the area. The discussed results have shown that brand memory is profoundly different from ad memory, which is a crucial aspect that research initiatives need to take into consideration when researching memory formation in advertising. Furthermore, neuroscience tools have shown to generate significant and beneficial results, which is why it is recommendable to continue using these tools for future research in the field of advertising. However, results concerning brand and ad memory have been mixed, demonstrating the complexity of the topic.

As previously discussed, research has related increased **arousal** with better memory. However the present study established that arousal does not always have a positive effect on memory. Arousal can in fact be destructive for memory formation. Therefore, further research is necessary to determine the conditions in which arousal impacts memory formation positively versus negatively. Moreover, the study has shown that **motivation** has a positive impact on ad memory, while not having an impact on brand memory. However, as this study demonstrated arousal and motivation are highly influential on each other. The interaction variable has not been the focus of the current research, but should be analysed more closely in follow up studies. Looking at **facial expressions**, this research has once again proven that emotions are a complex topic, where positive emotions seem to lead to lower brand memory. This seems counterintuitive, as one would expect that positive emotions would support memory formation. However, this only holds true for ad memory. Generally, the results demonstrate the importance of emotions for advertising success. Further, this emphasizes when researching the topic of advertising effectiveness, close attention should be paid on how emotions affect memory, particularly brand memory. Where the term *emotions* cannot be used as an overall factor, but instead needs be subcategorized into more specific emotions, such as arousal and motivation, as well as dividing between positive- and negative emotions. Here it is also beneficial to take different category effects into account, as the analysis has shown that different emotions are affecting memory in different ways across categories.

It should also be mentioned that to the authors' knowledge this study was the first study to relate **cognitive load** to advertising effectiveness. Furthermore, it should be noted that results concerning cognitive load were significant and strong. Additional research is therefore strongly advised to gain a better understanding of how cognitive load relates to advertising success.

7.1.1 Improving Current Marketing Models

As the literature review above has shown, traditional marketing models such as AIDA are based on hierarchy of effect models that are clearly outdated (De Pelsmacker, et al., 2010; Genco, et al., 2013). Moreover, as Kahneman (2003) augmented, consumers are not only driven by intuition but also have the concept of bounded rationality. As mentioned, the concept of bounded rationality limits the amount of information consumers are taking into consideration when making a purchase decision. Following Kahneman's argumentations, it becomes evident that traditional models based on the rational consumer are invalid. Revised or new models should integrate the intuitive consumer where a better understanding of consumer behaviour can be established via neuromarketing. This study has made a first step towards understanding how emotions influence memory, which is one crucial element of effective advertising. More specifically, it has shown that neuromarketing can be used to understand emotions such as arousal and motivation using the EGG or facial expressions and how these drive memory. The above insights can hence be used to improve existing marketing- and neuromarketing models.

One example of this could be the earlier presented framework for studying how advertising works (Vakratsas & Ambler, 1999). The model can be used as a starting point for adaptation, as seen below.

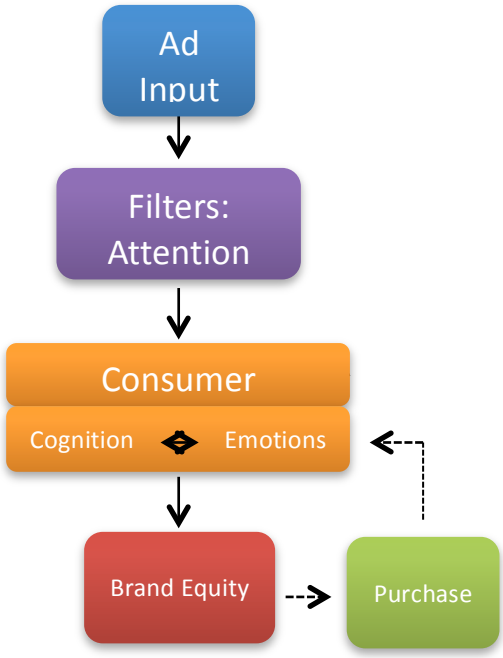


Figure 35: Framework for Studying How Advertising Works Revised

The model still begins with the ad input. However, the filter has been changed from the original model. Vakratsas & Ambler (1999) use motivation and ability inspired by the EML model. However, by integrating neuromarketing it is more suited to use attention as a filter. As discussed earlier, the different kinds of attention such as high and low attention are able to reflect on whether a consumer is motivated and capable to pay attention or will only peripherally notice the advertising. Here, future studies would also be able to investigate what ad elements are able to trigger bottom-up attention and how this would relate to brand memory formation.

If the ad stimulus passes the attention filter, consumers will consciously or unconsciously react to the stimuli. As this study has used unknown brands the experience factor has been removed. However, even though the main focus of this paper is to understand how emotions affect brand memory formation, cognition has been kept in the model since consumers are likely to also consciously evaluated ads. An integrated approach should be taken by focusing on emotions while still acknowledging the role of cognition. Moreover, purchase has been included in the model since the ultimate goal of many marketers is still to link advertising to purchase behaviour.

Overall, the adapted model shows that brand equity is the ultimate goal, as it is a broader and easier applicable concept than brand memory. However, in terms of this study brand equity is essentially brand memory, as it combines different aspects such as attitude and associations that are based on memory. Furthermore, it brand memory might be a concept that is easier measured in different studies than brand equity. Brand memory can further be used as a trigger of purchase behaviour. Clearly this is just one possible adaptation to the original model, using the input from this study. Nevertheless, it demonstrates that existing marketing models can be used to integrate neuromarketing knowledge and thereby guide future research.

There are already a few existing relatively new models that have been established within neuromarketing, such as the model of decisions and branding effects mentioned in the delimitations by Plassmann, Ramsøy, and Milosavljevic (2012).

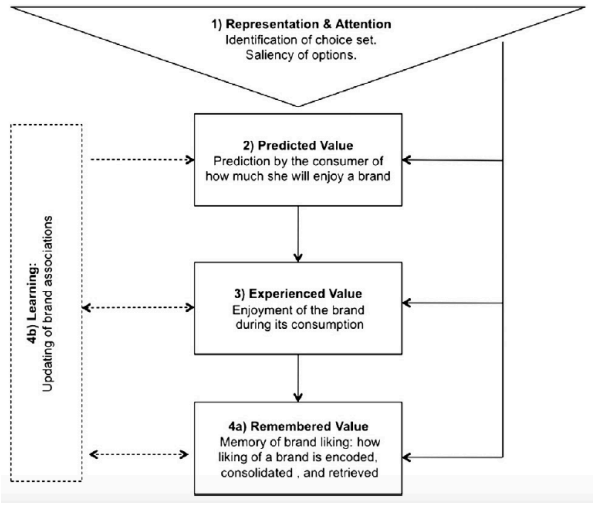


Figure 36: Model of Decisions and Branding Effects

This is a more comprehensive model that is presenting a framework for understanding underlying processes involved in brand decisions. The findings of this study could be used to enhance the given model as a better understanding of memory formation is beneficial within different parts of the model. This study has used unknown brands, where consumers had no prior brand knowledge, contributing to stage one and four of the thesis, but further investigating the topic will also be beneficial for other steps. Moreover, it should be noted that the model has been criticized for not providing a clear answer to the aspect of feelings and emotions, where step three might have an unconscious and conscious component. Therefore, it can be argued that further researching the studies topic including neuromarketing tools will benefit not only existing marketing models, but also emerging neuromarketing models.

Moreover, it can be argued that such novel models should integrate terms currently used within marketing such as brand awareness and brand attitude (Percy & Rosenbaum-Elliott, 2012) and terms used within neuromarketing such as brand memory and brand associations (Ramsøy, 2014) to create a more coherent picture. Further, this might also uncover or highlight parallels in conducted research that is currently not exploited.

7.1.2 Market Research versus Neuroscience Tools

Primarily, it should be noted that this study integrated a neuroscientific research approach within the field of marketing. This paper demonstrates that the discipline can highly benefit from neuroscience as it provides insights into biological and unconscious consumer processes. Having applied neuromarketing tools this thesis has therefore emphasized the strength of the tools.

However, it should be noted that marketing research has advanced over years without the use of neuroscience tools. This has led to research methods that are in fact based on qualitative data, but are nonetheless able to create strong predictive validity (Page, 2012). However, it is true that consumers cannot argue for or explain all decisions they make; in which respect Kahnemans' (2003) system one and two are highly relevant. These systems demonstrate that many decisions consumers form are based on intuition and involve automatic responses. Conversely, it is also going to an extreme to argue that all decisions are unconscious and emotionally driven (Page, 2012). When making decisions it is assumed that consumers also use elements of control and consideration. Here, research tools by companies, such as Millward Brown, have shown good prediction power of both advertising success and consumer behaviour. Therefore, at the current state of research efforts neuromarketing should be perceived as an additional tool that provides supplementary insights, particularly into consumers' intuitive responses.

Neuromarketing has been in the focus of attention, where an increasingly amount of academics has started to write about and use the tools of neuromarketing (Plassmann, et al., 2011). At the same time, it should be noticed that there has been a similar hype around subliminal advertising, which has quickly faded again (Ariely & Berns, 2010). This study has shown how neuromarketing can be used to improve advertising. However, the tools can be used for much more and it is recommendable to further integrate it into practice, in order to answer more profound questions on how marketing works. Thereby, it can be ensured that neuromarketing will not only be hype, but will remarkably enhance market research.

7.1.2.1 Integrating Neuroscience Methods into Marketing

The main purpose of this study has been to gain a better understanding of brand memory formation within advertising and has shown that the applied tools are highly beneficial for investigating the success of advertising based on memory formation. Therefore, it is recommendable to extent research within this field. As previously discussed, in the past it has been difficult to link advertising to direct market results, also based on the difficulty of defining ad effectiveness. However, with the quick enhancements in neuromarketing, a better understanding of consumers' mental worlds can be established, thereby not only establishing a better understanding of ad effectiveness and the predictability of ad success, but also brand success. Already now, it is evident that brands create financial value (Goodson, 2012). With further engagement into neuromarketing, it might therefore also become possible to better link branding activities to financial results.

At the same time, the current study has reflected on commonly used advertising effectiveness measurements, such as ad likability and recall. As the discussion of ad likability has shown, ad-based measured do not seem to be able to successfully predict memory, more specifically brand memory. Supporting the results from this study iMotions (2013) demonstrated that the more participants liked an ad, the lower it scored on brand memory. Therefore, the authors propose that future research should focus on brand-based measures, such as beliefs and attitudes about a seen brand. This is also in line with Bergkvist & Rossister (2008). Moreover, the discussion has shown that memory is essentially composing knowledge in many different ways forming a network of features that consumers link to a brand (Krishnan, 1996). Therefore, it is advisable to combine different measures such as recall, recognition, associations, and attitudes. Neuroscience tools can in this case strengthen the measurement tools, as research does not only need to rely on self-reported answers, but can underscore and base findings on behavioural, physiological, and neurological measurements. Here an eye-tracker can be used to exactly test what consumers pay attention to and remember afterwards. EGG and facial coding can be used, as done in this study, to better understand how emotions drive memory.

7.2 Managerial Implications

Not only does this study provide academic implications, but the results of successful prediction of ad- and brand memory can certainly also benefit marketers and ad agencies. Today's advertisers compete in many ways for the most innovative and creative execution of their advertisement. Generally, a widespread recognition of the importance of creative advertising appears to lure between them. They go head to head for prestigious awards, such as the Creative Circle Award (Creative Circle, 2015), go all-in with emotional storylines, and attempt to get their ad to go viral on the Internet. However, the important goal that the advertisements ensure brand memory seems to be forgotten in the mist of creative executions. First, it is crucial for companies to understand that brand memory and ad memory are not the same, but even negatively correlated. In order to increase advertising effectiveness, it is therefore recommendable to test whether an ad establishes successful brand memory. Doing so before campaign execution, will ensure that advertisings are not solely triggering ad memory, while not forming brand memory. Here it should be emphasized again that brand memory is perceived as more relevant than ad memory also from a managerial point of view. In this process of testing ad and brand memory, neuroscience tools can be of great value as the EEG and facial coding can be used to predict memory. Testing emotional reactions of consumers can

ensure that brands are well integrated into the ad story, where content that triggers crucial emotions in the ad are well liked to the brand. Therefore, ad agencies or market research agencies should consider integrating these tools when evaluating ads. Moreover, findings have suggested that brands needs to be central not peripheral to the ad in order to increase brand memory. This highlights again the importance of integrating the brand into memorable aspects of the ads.

Even though emotions have been proved to be the best predictors of consistent preference and behaviour (Lee, et al., 2009), the presented research has shown that not all emotional responses have a positive influence on brand memory. For instance as discussed **positive facial** expressions were found to have a negative relationship to brand memory formation. However, this does not mean that the authors are suggesting that all positive facial expressions should not be a goal for advertisements, but rather strengthens the argument of a profound understanding of emotional responses and what relations these different responses have to brand memory is needed, in order to create the most effective communication solutions (Hansen & Christensen, 2007). Moreover, prior research has shown that **arousal** is beneficial for memory. However the present study demonstrated that it is more complicated than this, where arousal does not always have the same effect. Therefore, arousal levels need to be optimized on an individual ad level, where ads should be tested individually with specific goals that have been defined, in mind. Here the study has shown that it is beneficial to take the ads category into account. The analysis has shown that emotions have different effects on the different categories. This will thereby help marketers to trigger the right emotions in order to increase brand memory. Overall, it can therefore be said that marketers need to be aware of the different emotional affects, when producing ads that trigger many different and strong emotions, in order to optimize ad success.

Furthermore, it should be noted that results concerning **cognitive load** were significant and strong. Interesting implications can therefore be drawn. As brand managers often focus on the creative execution of an ad, the story line should be tested in relation to cognitive load levels. This study has shown that high cognitive load is negatively related to brand memory; therefore should the content of the ad not requite too much cognitive involvement when brand memory is the goal. Here examples could be that consumers clearly know which category the product belongs to, what the main message is or that the ad uses a simple story line.

More generally speaking, the study supports the argumentation of the usage of neuroscience methods within advertising, as it will support the prediction of advertising success. The authors

believe that memory is a crucial concept not only for advertising, but also branding activities overall. At the same time neuroscience tools can be used to investigate other areas besides memory formation. Thereby, adding on to the present study.

7.2.1 Integrating Neuromarketing into Practice

Professionals within this business highlight that the hard natural science-based discipline of cognitive neuroscience should be integrated with soft social science in order to reach the most effective brand building strategies (Gordon, 2002; Walvis, 2007). The following part will therefore present a more practical demonstration of implications for marketers in the corporate world.

Even though the biggest market research firms such as Millward Brown, TNS, and Nielsen already implement neuroscience methods the importance of doing so and further initiating the usage of it should be emphasized. As discussed, traditional advertising testing methods include copy testing and self-reported measures such as surveys and questionnaires. These can be improved, as they will become more effective when including neuroscience tools, such as the EGG, facial coding and the eye tracker.

Looking at today's consumer consumption it is fair to argue that brands are becoming increasingly important, influencing which products consumers prefer, and thereby creating monetary value for companies (Goodson, 2012). Therefore, the concept of **brand equity** is not only relevant for academic implications, but is also useful practical implications. Assigning a value to a brand (De Pelsmacker, et al., 2010), brand equity reflects on how consumers think, feel, and act with respect to the brand, as well as prices, market share and profitability. Nowadays, market research is already using the model to define the strength of a brand. One example is the Millward Brown's BrandDynamics brand equity research tool (Millward Brown, 2014). This tool is a quantitative, survey- based method, explicitly asking consumers about brand perceptions. These approaches have been proven to successfully relate survey-results to purchasing behaviour (Page, 2012). However, it can be argued that integrating neuromarketing tools will give a more comprehensive picture. Examples include, the eye tracker, which can be used to measure the visual attention that is being paid to a brand, EGG measures, which examines consumers' immediate responses to a brand and facial coding, which can support the understanding of emotional reactions toward a brand. The current study contributes to the concept by demonstrating that a brand is a bundle of meaning; essentially consumer's memory of the brand. Thereby, the generated knowledge can be used to better ensure brand equity support in advertising.

Part 8: Conclusion: Wrapping it up

"*Bad advertising is as good as no advertising*

It just costs more!"

Admap, 2014

The subject and research question of this paper were inspired by the widespread notion that emotions have a positive relationship with advertising; the more creative and emotional an ad is the better. However, from many perspectives this statement can be considered contradicting. One of the cases, which led the authors to assume otherwise, is the case of Evian's "roller babies" advertisement. Even though the ad's creativity and popularity was rewarded, Evian had not only a sale stall, but also a sale decrease. This led to the assumption that creativity and ad-induced emotions do not always have a positive impact on the brand. The urge of new insights of how ad-induced emotions indeed effect the consumer's memory formation; for both the ad itself, as well as the advertised brand, has consequently built the foundation for this research. It should be further mentioned that the authors are aware of the fact that Evian's decrease in sales could have possibility been triggered by other factors than the advertisement. Here, possible explanations are the difficult economic situation or the product quality as such. However, this study has focused on an advertising perspective. It is therefore assumed that if the ad was as successful as originally thought, it still should have positively influenced sales, since Evian's product of water can be considered a commodity.

With the chosen focus on advertising, the role of emotional processes and its relation to memory formation of respectively the ad and the advertised brand has been unravelled. This has been approached from both a theoretical and practical standpoint. Neuroscientific studies have proposed that it is primarily emotions and not rationality that plays a vital part in influencing perception, cognition, and behaviour. Research into emotional processes is vital for development of marketing and advertising campaigns, because, as this paper demonstrates, successful branding and advertising depends on understanding and developing not only an emotional appeal towards consumers, but also creating brand memory. As the results display, there's a huge difference between memory formation towards either the ad or to the brand, and how these are achieved. Furthermore, it is shown that the term *emotions* cannot be used as an overall factor, but need instead be subcategorized into more specific emotions, such as arousal and motivation, as well as dividing between positive- and negative emotions.

However, the issue within advertising and marketing practice persists; Traditional research methods are not able to uncover emotional processes as they are only reflected in the brain and through physiological reactions. By applying neuroscientific research results and physiological reactions to advertising and marketing stimuli, under the discipline of neuromarketing, traditional research methods can be enhanced. Although, neuromarketing can and should not be used to guide behaviour, it can be used to develop a better understanding of how emotional processes influence memory formation. This has the potential to illuminate why some advertising spark brand memory, whilst others solely contribute to ad memory. In turn, this can guide towards creating more effective advertising executions, branding and marketing strategies.

During this experiment various factors of emotions were measured when subjects watched 16 advertisements in the categories of fashion, FMCG, food, and social cause. When measuring emotions individually with the EGG, arousal for both ad- and brand memory was found to be negatively related to both ad and brand memory. Opposite of what was assumed, higher arousal did not increase ad- and brand memory, therefore denying H_{1a} and H_{1b}. Furthermore, measuring motivation it was found that it has a positive relationship to ad memory, whereas negative to brand memory, supporting H_{2a} and rejecting H_{2b}.

Not only arousal and motivation were measured throughout the experiment, but also facial expressions. The results showed many interesting findings, such as the fact that whilst positive facial expressions ensure ad memory, therefore accepting H_{3a}, it does not applicable to brand memory, rejecting H_{3b}. Concerning negative facial expressions it was found that negative facial expressions were negatively related to ad memory, accepting the H_{4a}, and positively related to brand memory, rejecting H_{4b}. This finding once again states that brand memory formation induced by an ad is not as straightforward as assumed.

Therefore, an important conclusion to draw is that branding in advertising is far more difficult than generally assumed, and involves more than simply putting the name or package in the middle or at the end of a commercial (Gordon & Langmaid, 1986). Branding is integral to any execution, where creating the most involving or enjoyable ad is admirable. However, unless there is an existing link to the brand, it is no more than entertainment. Memorable advertising can be enjoyable and involving, but above all it needs to foster brand memory. The bottom line should therefore be effect rather than entertainment. In essence, it is important for an ad to leave traces in the memory, but these must be associated with the brand. The key is therefore to study, which emotions induce brand

memory. Branding experts must focus on the fact that the brand must be integrated within the ad's storyline, which is not solely accomplished by having a highly entertaining ad with the brand simply placed in an arbitrary fashion.

Generally, these findings are valuable not only for branding as well as cognitive neuroscience academic disciplines, but are also particularly useful in the corporate world. Producing great advertising is far more an art than a science, but there are steps as to how to achieve this. Even the most rigorously constructed strategy is nothing without brand insight. As the famous quote from John Wanamaker goes: "*I'm sure I'm wasting at least half of my advertising budget. The trouble is I don't know which half!*". Using the above insights gathered with help from neuroscience, it may in fact be possible to avoid at least some of the inefficient parts of the marketing budget, and achieve ones ultimate advertising goals.

Part 9: Perspectives for Future Research

The following section identifies specific areas for future research. This platform for future explorations is needed due to the current lack of research on the subject of ad content interference with brand memory. On the one hand, future research should focus on deepening and validating the initial insights and on the other hand it should broaden the perspective of investigation.

9.1 Emotions

At the centre of this thesis has been the topic of emotions. As it has been demonstrated, it is a very complex topic, where a lot of options for future research exist. First, it should be considered to more closely investigate how emotions influence each other. For example, the discussion of surprise has shown that surprise can increase motivation, whereas results from this study have demonstrated that arousal highly overlaps with facial coding, indicating that there must be different facial expressions that show the same effects as arousal. Furthermore, results concerning negative emotions have been mixed, which is why future research is required.

Concerning ad effectiveness it should also be mentioned that this research has focused on emotional effects on processing advertising messages and thereby memory creation during exposure. It can therefore be argued that this study has looked at the front end of advertising processing, thereby looking at how emotions impact memory formation during the exposure. However, it is also of

importance to gain a better understanding of the consequences and how ad-induced emotions impact decision-making after exposure and during other situations such as purchase decisions.

Furthermore, this study has found interesting results based on **cognitive load**. As the prior discussion has shown, cognitive load has not received much attention concerning advertising effectiveness. It is therefore recommended to do further research concerning cognitive load and advertising effectiveness. Here on interesting perspective could be to test the interaction between arousal and cognitive load and the interaction between valence and cognitive load. As arousing negative messages are allocated significantly fewer capacity resources they are still remembered better than calm messages, whereas arousing positive messages seem to be allocated significantly more processing resources (Lang, et al., 1995). This suggests that positive and negative messages are, at least when they are arousing, processed in different ways. Therefore, future research should investigate how cognitive load affects brand memory formation, taking into consideration whether the ads include positive or negative arousing messages.

Not only based on the presented results, but also concerning the general discussion of creative ads, can it be concluded that further research will be beneficial. As the Evian ad and other viral ads have shown, if people strongly like an ad, they are much more likely to engage with it and share it. Therefore the likelihood that more people will see it is increased and brand exposure and subsequent brand memory should also be higher. Even though in this paper, it has been argued that ad likeability is not necessarily the best measurement tool for ad effectiveness, in terms of sharing a clip online it might be a different aspect. Therefore, further research focusing solely on online ads and including the aspect of ad likeability and memory is recommended. Considering this topic of viral ads and sharing those, many studies have also considered the aspect of motivation (Dafonte-Gómez, 2014). Here, researchers praised the ability to reflect upon the motivations that make a simple spectator become a tool for the message distribution, subjecting likes, preferences, and even convictions to the scrutiny of their community through the action of forwarding the content (Sundaram, et al., 1998). A tool like this could also include a popularity score by using the number of views the ad has on the video sharing website, YouTube, and the number of “likes” it has received. Here it would further be of interest to investigate how these viral videos impact brand memory.

9.2 Memory

Memory is the second big component of this thesis. It should be noted that all results have been based on the constructed BMS and AMS scores. Memory was assessed as follows: (1) top-of-mind without cue, (2) top-of-mind with cued product category, (3) screenshots of the ad, where no brand name or product was shown; (4) due to using unknown brands, attribute formation took place during exposure; (5) the time delay between ad exposure and brand recall was 20-30 minutes, not days; and (6) ad judgments, but no product decisions, were rendered. Conclusions have consequently been based on the established BMS and AMS. However, memory might have been established in different ways, so that memory was not captured via the chosen testing procedure. It could for example be possible that memory has been formed unconsciously, but has not been triggered with the chosen recall and recognition measures. Therefore, studies using a different memory test should be performed. Moreover, using the present results, one could also more detailed analyse the different memory scores such as recall, recognition and collected associations, rather than combining them in one score. Additionally, further research could include a more specific rating of the order in which brands and advertisements were remembered in the free recall task. This could for instance be done by using Ramsøy's (2014) NeuroEquity Battery rating.

9.3 Attention

Attention has not been the focus of this study, but also plays a vital role when discussing memory formation. Therefore, future research could include analysing eye-tracking data to receive a better understanding of how attention influences memory formation.

Moreover, a possible future research is the study field about the unconscious mind. Here, it is mainly referred to Heath (2012) who proposed that advertising might work best when consumers are not paying attention. As this experiment focused on participants observing the ads, focusing on non-attention situations would be an interesting starting point for future research. This could also be studied outside the lab, as consumers are much easier distracted from advertising in real-life situations. Here different focus perspectives are possible. One could for instance research on more specific types of memories, such as explicit and implicit memories (Genco, 2013) or more generally focus on how consumers form unconscious memories and how ad- and brand memory differ in this perspective.

9.4 Noteworthy Thoughts

This study has focused on the concept of brand memory, thereby considering brand memory as one of the most important goals of advertising. However, there are many different definitions of **ad effectiveness**, and it is very much depend on the goals that are being defined for a specific campaign. It is therefore recommended to research additional areas with a different focus. Examples of this could include purchase intention, purchase, or creating loyalty. Moreover, not only other advertising goals would be interesting to study, but also other marketing initiatives supporting the campaign. Here product packaging, promotions, and in-store promotions should be considered.

Concerning the **study design**, there are several things that should be discussed, as results could be advanced by implementing a different study design. This study has tested four different categories, each containing four ads. The study could be replicated focusing only one **category** at a time, to receive more penetrative results. Further research could also choose another angle by categorizing the different ads not only on their product category, but also based on whether they are rated as funny, sexual, boring, and similar factors. This categorization would maybe result in interesting outcomes based on whether the rating of the ad content influence brand memory. Here it would then be of interest to analyse whether ads trigger the right emotions.

Furthermore, all results per participant have been collected within one session. It would be of interest to do a similar study over a **longer period of time** to not only analyse various brand exposures, but also see how longer time between viewing and recall tests would impact the results.

Another interesting aspect is the usage of **known brands**. This study has only used unknown brands in order to simplify memory testing. However, visual attention, emotional response, and liking are strongly affected by the salience of brands. Greater brand knowledge might produce stronger links in the ad memory trace and reduce the need for a cue recall tasks.

This study has further tested all participants using the same screen. However, Reeves and collegaues (1999) have demonstrated that the **screen size** impacts emotions. Taking into consideration that nowadays consumers are using many different devices and that devices come in all kinds of sizes, this is another interesting point of departure.

Finally, it should also be pointed out again that the study was conducted in a laboratory. Bearing in mind the limitation of application of the laboratory experiment results (Hair, et al., 2009) and the fact that consumers are exposed to advertising in **real life**, where distractions are much more likely

to happen and thereby would impact memory formation tremendously, it should be considered to perform a similar study in a real-life environment. Here portable eye-tracking and EEG devices could be used. Furthermore, it would make sense to not only test how consumers are reacting when being exposed to advertising in real life, but also to test how memory effects brand choices. It would be of interest to test whether and how participants are influenced in their purchase behaviour, therefore in-store research is recommendable.

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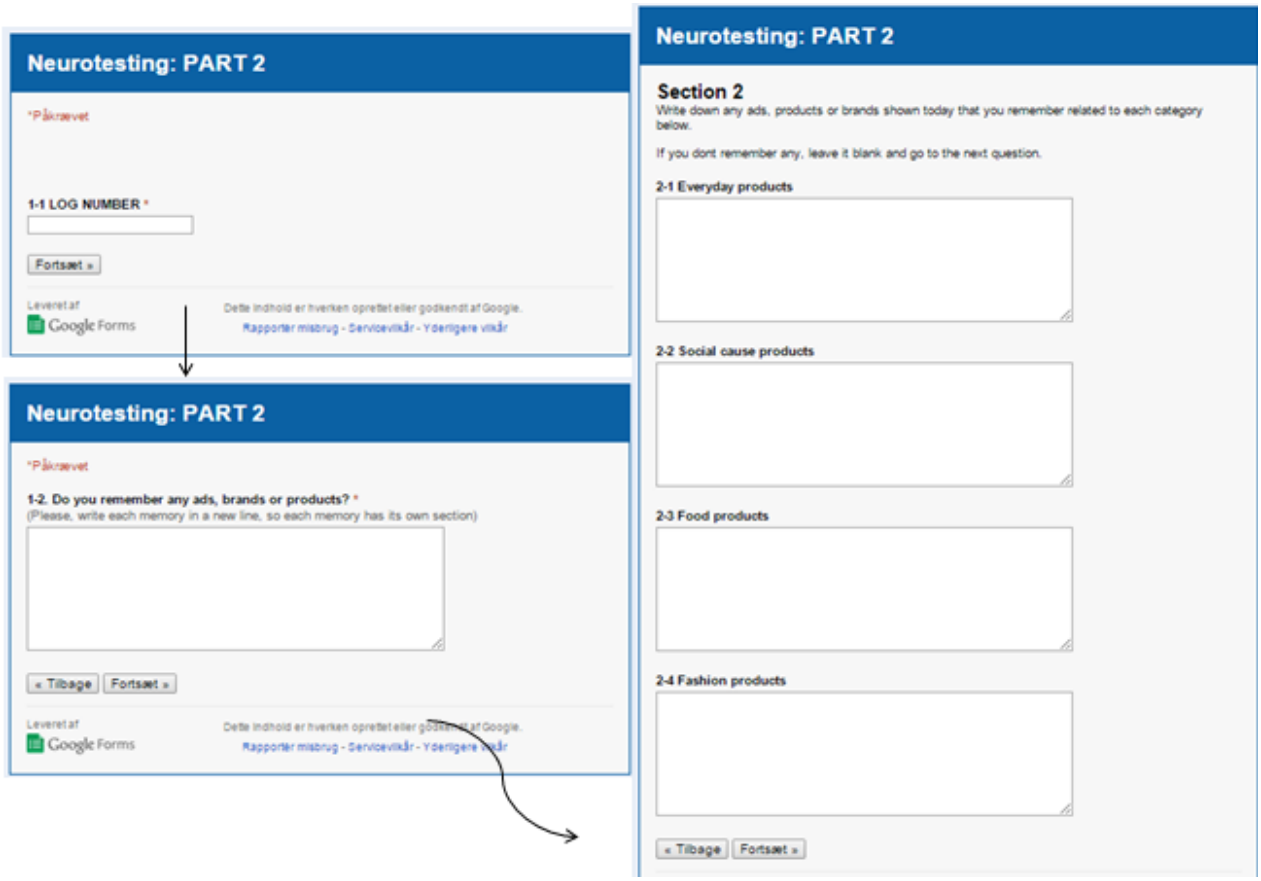
Part 11: Appendices

11.1 Overview of Survey



Neurotesting: PART 2

*Påkrævet

Ad 2

2.1. What comes to mind when you see the ad? *

2.2. How certain are you that you have seen the ad today? *
If you haven't seen the ad (value 0), please go to the next page

0 1 2 3 4 5 6 7 8 9 10

Not at all ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Very much

2.3. How well do you like the ad?

0 1 2 3 4 5 6 7 8 9 10

Not at all ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Like very much

2.4. Which category do you think the ad belongs to?

- ○ Food
- ○ Everyday products
- ○ Social causes
- ○ Fashion
- ○ Andet: _____

2.5. Which brand shown in the collage below do you think the ad belongs to?

- ○ Hugo Boss
- ○ Blush
- ○ Joe's Jeans
- ○ Gildan
- ○ Brooks Brothers
- ○ Pollux

2.6. How likely would you be be willing to buy/invest in the promoted offer in the ad?

0 1 2 3 4 5 6 7 8 9 10

Very unlikely ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Very likely

2.7. How much would you be willing to pay for the promoted product in the ad?
(In Danish kroner)

0 1 2 3 4 5 6 7 8 9 10

0 kr ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ 2.000 kr

« Tilbage | Fortsæt »

Leveret af Google Forms

Neurotesting: PART 2

*Påkrævet

Ad 12

12.1. What comes to mind when you see the ad? *

12.2. How certain are you that you have seen the ad today? *
If you haven't seen the ad (value 0), please go to the next page

0 1 2 3 4 5 6 7 8 9 10

Not at all ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Very much

12.3. How well do you like the ad?

0 1 2 3 4 5 6 7 8 9 10

Not at all ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Like very much

12.4. Which category do you think the ad belongs to?

- ○ Food
- ○ Fashion
- ○ Everyday products
- ○ Social causes
- ○ Andet: _____

12.5. Which brand shown in the collage below do you think the ad belongs to?

- ○ BC Childrens Hospital Foundation
- ○ War Child
- ○ World Vision
- ○ Casa Alianza
- ○ Red Cross
- ○ Fruit Tree Foundation

12.6. How much would you be willing to buy/invest in the promoted product in the ad?

0 1 2 3 4 5 6 7 8 9 10

Very unlikely ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Very likely

12.7. How much would you be willing to pay for the promoted product in the ad?
(In Danish kroner)

0 1 2 3 4 5 6 7 8 9 10

0 kr ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ 2.000 kr

« Tilbage | Fortsæt »

Leveret af Google Forms

Neurotesting: PART 2

*Påkrævet

Ad 14

14.1. What comes to mind when you see the ad? *

14.2. How certain are you that you have seen the ad today? *
If you haven't seen the ad (value 0), please go to the next page

0 1 2 3 4 5 6 7 8 9 10

Not at all ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Very much

14.3. How well do you like the ad?

0 1 2 3 4 5 6 7 8 9 10

Not at all ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Like very much

14.4. Which category do you think the ad belongs to?

- ○ Food
- ○ Fashion
- ○ Social causes
- ○ Everyday products
- ○ Andet:

14.5. Which brand shown in the collage below do you think the ad belongs to?

- ○ Olive Garden
- ○ Knorr
- ○ Carl's Jr.
- ○ A.1. Steak Sauce
- ○ Moe's Southwest Grill
- ○ IHop Resturant

14.6. How much would you be willing to buy/invest in the promoted product in the ad?

0 1 2 3 4 5 6 7 8 9 10

Very unlikely ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Very likely

14.7. How much would you be willing to pay for the promoted product in the ad?
(In Danish kroner)

0 1 2 3 4 5 6 7 8 9 10

0 kr ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ 2.000 kr

« Tilbage | Fortsæt »

Neurotesting: PART 2

*Påkrævet

Ad 16

16.1. What comes to mind when you see the ad? *

16.2. How certain are you that you have seen the ad today? *
If you haven't seen the ad (value 0), please go to the next page

0 1 2 3 4 5 6 7 8 9 10

Not at all ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Very much

16.3. How well do you like the ad?

0 1 2 3 4 5 6 7 8 9 10

Not at all ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Like very much

16.4. Which category do you think the ad belongs to?

- ○ Fashion
- ○ Food
- ○ Social causes
- ○ Everyday products
- ○ Andet:

16.5. Which brand shown in the collage below do you think the ad belongs to?

- ○ Pampers
- ○ Infusium 23
- ○ Degree
- ○ Green Giant
- ○ Clorox
- ○ Arm & Hammer

16.6. How much would you be willing to buy/invest in the promoted product in the ad?

0 1 2 3 4 5 6 7 8 9 10

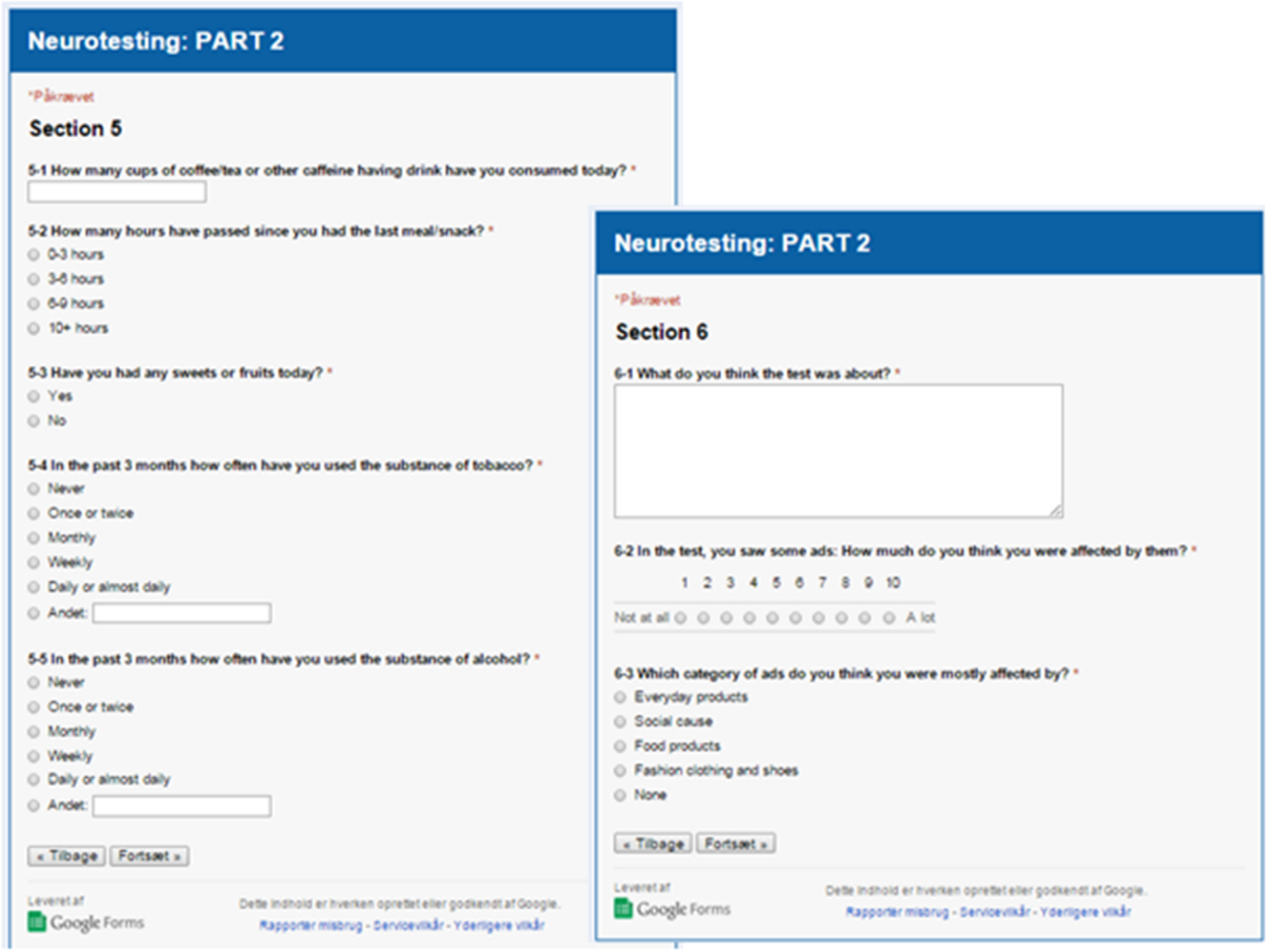
Very unlikely ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Very likely

16.7. How much would you be willing to pay for the promoted product in the ad?
(In Danish kroner)

0 1 2 3 4 5 6 7 8 9 10

0 kr ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ 2.000 kr

« Tilbage | Fortsæt »



Neurotesting: PART 2

*Påkrævet

Section 5

5-1 How many cups of coffee/tea or other caffeine having drink have you consumed today? *

5-2 How many hours have passed since you had the last meal/snack? *
- 0-3 hours
- 3-6 hours
- 6-9 hours
- 10+ hours

5-3 Have you had any sweets or fruits today? *
- Yes
- No

5-4 In the past 3 months how often have you used the substance of tobacco? *
- Never
- Once or twice
- Monthly
- Weekly
- Daily or almost daily
- Andet:

5-5 In the past 3 months how often have you used the substance of alcohol? *
- Never
- Once or twice
- Monthly
- Weekly
- Daily or almost daily
- Andet:

« Tilbage Fortsæt »

Leveret af Google Forms

Dette indhold er hverken oprettet eller godkendt af Google.
Rapporter misbrug - Servicevilkår - Yderligere vilkår

Neurotesting: PART 2

*Påkrævet

Section 6

6-1 What do you think the test was about? *

6-2 In the test, you saw some ads: How much do you think you were affected by them? *

1 2 3 4 5 6 7 8 9 10

Not at all ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ A lot

6-3 Which category of ads do you think you were mostly affected by? *
- Everyday products
- Social cause
- Food products
- Fashion clothing and shoes
- None

« Tilbage Fortsæt »

Leveret af Google Forms

Dette indhold er hverken oprettet eller godkendt af Google.
Rapporter misbrug - Servicevilkår - Yderligere vilkår

Neurotesting: PART 2

*Påkrævet

Section 7

7-1 Please specify below which brands you knew about before this experiment *

- [ ] BC Children's Hospital
- [ ] World Vision
- [ ] Casa Alianza
- [ ] War Child
- [ ] Degree
- [ ] Clorox
- [ ] Infusium 23
- [ ] Arm & Hammer
- [ ] A.1.
- [ ] Moe's Southwest Grill
- [ ] Carls Jr.
- [ ] Olive Garden
- [ ] Gildan
- [ ] Pollux
- [ ] Joe's Jeans
- [ ] Brooks Brothers
- [ ] None of the above

« Tilbage Send

Indsend aldrig adgangskoder via Google Analyse.

11.2 Index of Memory Score

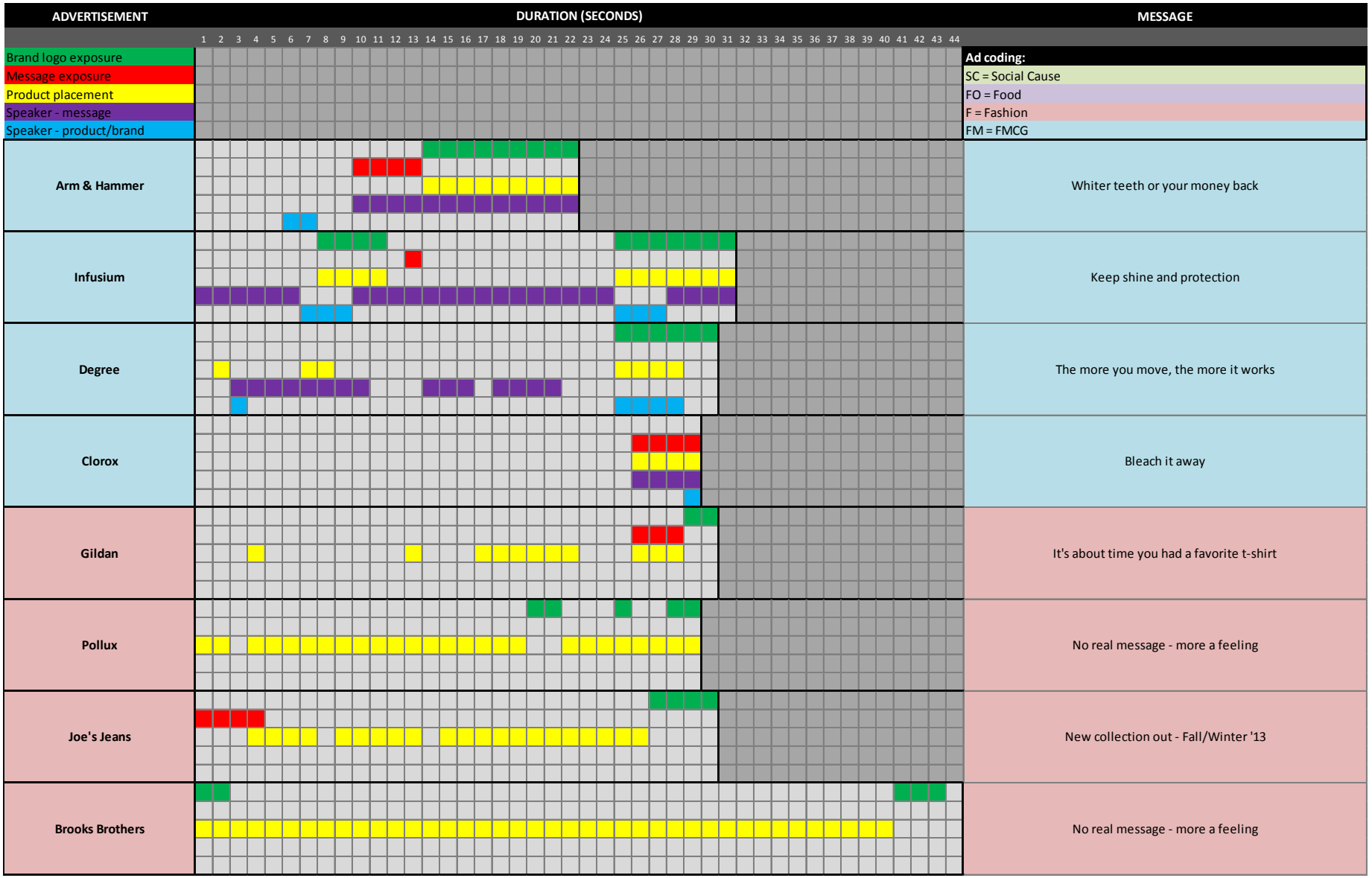
	Priority	Scale		Index	Carls Jr	Index		Infusium	Index		Casa Alianza	Index		Moe's	Index	
Brand																
Top-Of-Mind Associations	3	30	90		10	30		3	9		0	0		19	57	
Category Cued Associations	2	50	100		12	24		0	0		19	38		2	4	
Brand Recognition	1	103	103		100	100		39	39		77	77		90	90	
Total Brand Score			**293**	**100**		**154**	**53**		**48**	**16**		**115**	**39**		**151**	**52**
Ad/Product																
Top-Of-Mind Associations	3	50	150		47	141		43	129		38	114		35	105	
Category Cued Associations	2	55	110		53	106		53	106		46	92		45	90	
Certainty seeing the ad	1	1030	1030		1011	1011		1010	1010		1030	1030		1028	1028	
Total Ad Score			**1290**	**100**		**1258**	**98**		**1245**	**97**		**1236**	**96**		**1223**	**95**
TOTAL MEMORY SCORE			**1876**	**100**		**1412**	**75**		**1293**	**69**		**1351**	**72**		**1374**	**73**

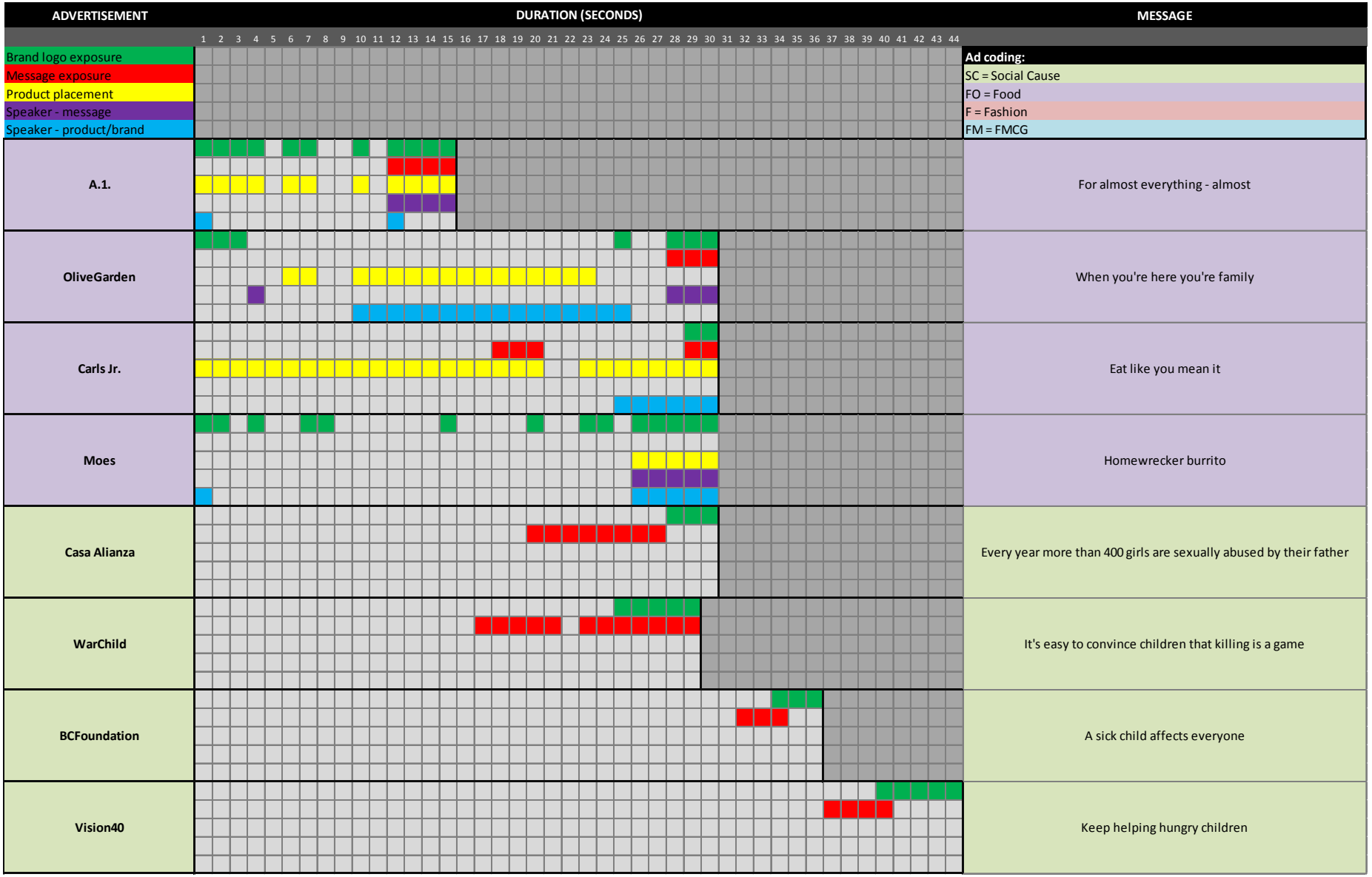
	Priority	Scale		Index	Clorox	Index		World Vision	Index		Arm & Hammer	Index		BC Childrens Hospital	Index	
Brand																
Top-Of-Mind Associations	3	30	90		3	9		1	3		2	6		2	6	
Category Cued Associations	2	50	100		7	14		1	2		1	2		6	12	
Brand Recognition	1	103	103		75	75		59	59		95	95		84	84	
Total Brand Score			**293**	**100**		**98**	**33**		**64**	**22**		**103**	**35**		**102**	**35**
Ad/Product																
Top-Of-Mind Associations	3	50	150		30	90		31	93		17	51		18	54	
Category Cued Associations	2	55	110		39	78		33	66		22	44		20	40	
Certainty seeing the ad	1	1030	1030		1026	1026		1027	1027		1030	1030		1030	1030	
Total Ad Score			**1290**	**100**		**1194**	**93**		**1186**	**92**		**1125**	**87**		**1124**	**87**
TOTAL MEMORY SCORE			**1876**	**100**		**1292**	**69**		**1250**	**67**		**1228**	**65**		**1226**	**65**

	Priority	Scale		Index	Degree		Index	Olive Garden		Index	WarChild		Index	Brooks Brothers		Index
Brand																
Top-Of-Mind Associations	3	30	90		1	3		21	63		4	12		31	93	
Category Cued Associations	2	50	100		17	34		5	10		12	24		3	6	
Brand Recognition	1	103	103		63	63		80	80		81	81		78	78	
Total Brand Score			**293**	**100**		**100**	**34**		**153**	**52**		**117**	**40**		**177**	**60**
Ad/Product																
Top-Of-Mind Associations	3	50	150		17	51		18	54		16	48		13	39	
Category Cued Associations	2	55	110		18	36		16	32		16	32		15	30	
Certainty seeing the ad	1	1030	1030		1028	1028		1019	1019		991	991		1028	1028	
Total Ad Score			**1290**	**100**		**1115**	**86**		**1105**	**86**		**1071**	**83**		**1097**	**85**
TOTAL MEMORY SCORE			**1876**	**100**		**1215**	**65**		**1258**	**67**		**1188**	**63**		**1274**	**68**

	Priority	Scale		Index	Pollux		Index	Gildan		Index	Joe's Jeans		Index	A.1		Index
Brand																
Top-Of-Mind Associations	3	30	90		8	24		0	0		8	24		11	33	
Category Cued Associations	2	50	100		30	60		0	0		9	18		11	22	
Brand Recognition	1	103	103		86	86		75	75		95	95		25	25	
Total Brand Score			**293**	**100**		**170**	**58**		**75**	**26**		**137**	**47**		**80**	**27**
Ad/Product																
Top-Of-Mind Associations	3	50	150		14	42		5	15		5	15		3	9	
Category Cued Associations	2	55	110		14	28		8	16		7	14		4	8	
Certainty seeing the ad	1	1030	1030		1015	1015		905	905		1026	1026		746	746	
Total Ad Score			**1290**	**100**		**1085**	**84**		**936**	**73**		**1055**	**82**		**763**	**59**
TOTAL MEMORY SCORE			**1876**	**100**		**1255**	**67**		**1011**	**54**		**1192**	**64**		**843**	**45**

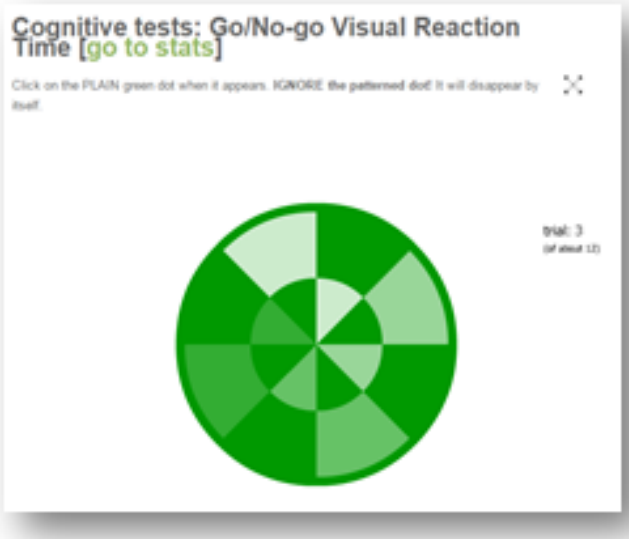
11.3 Overview of Ads

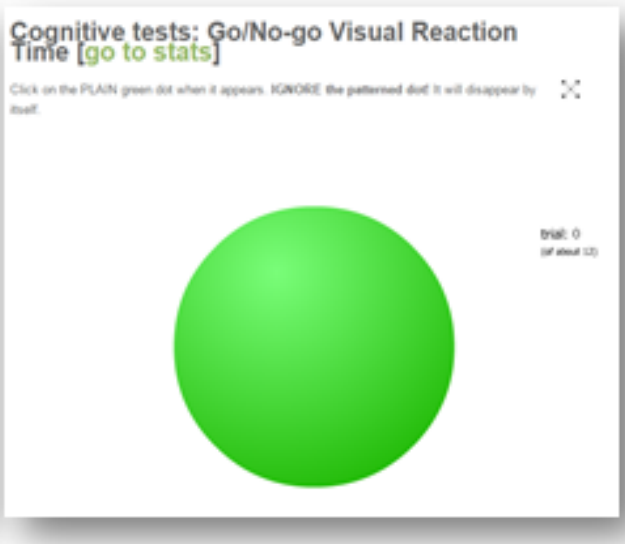



ADVERTISEMENT
DURATION (SECONDS)
MESSAGE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44
Brand logo exposure
Message exposure
Product placement
Speaker - message
Speaker - product/brand
Ad coding:
SC = Social Cause
FO = Food
F = Fashion
FM = FMCG
A.1.
For almost everything - almost
OliveGarden
When you're here you're family
Carls Jr.
Eat like you mean it
Moes
Homewrecker burrito
Casa Alianza
Every year more than 400 girls are sexually abused by their father
WarChild
It's easy to convince children that killing is a game
BCFoundation
A sick child affects everyone
Vision40
Keep helping hungry children

11.4 The Distraction Test

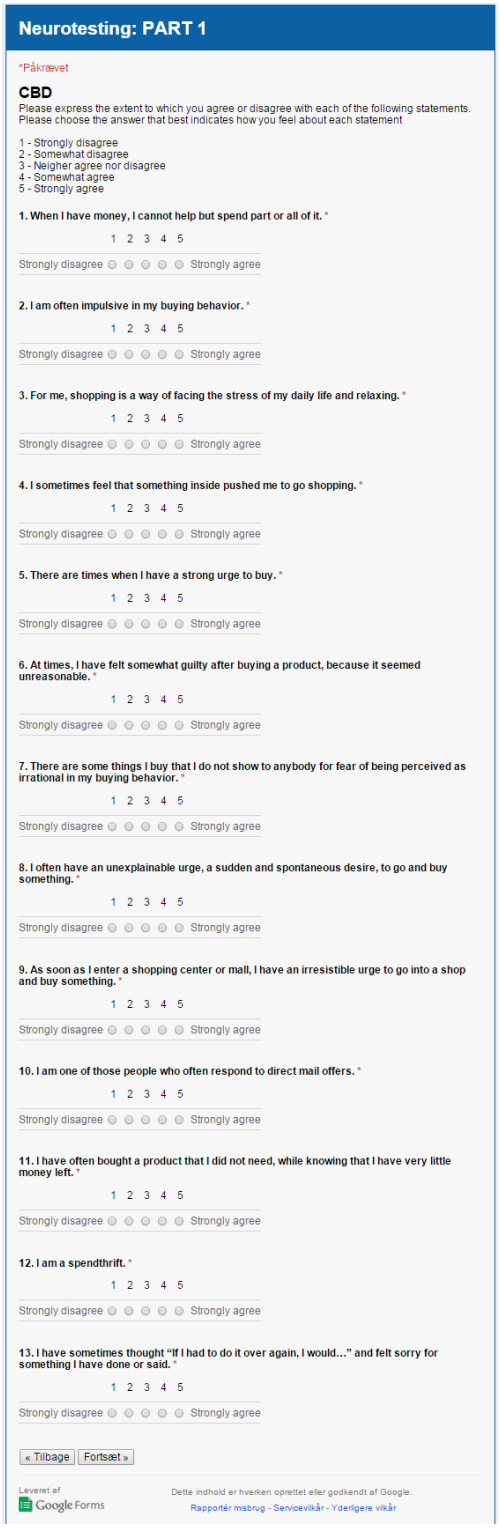
The first distraction test used after the experiment was a visual reaction time test called go/no-go. Here, we tested participants' reaction time by making them click on a green circle that needs to be responded to, as well as avoid clicking on a patterned circle, that the participants should *not* be responded to. In other words, response to the alternate stimulus had to be inhibited.7





11.5 The Distraction Survey

The below shows the first two pages of the distraction survey given to the participants after doing the distraction test for about two minutes.



Neurotesting: PART 1

*Påkrævet

CBD

Please express the extent to which you agree or disagree with each of the following statements. Please choose the answer that best indicates how you feel about each statement

1 - Strongly disagree
2 - Somewhat disagree
3 - Neigher agree nor disagree
4 - Somewhat agree
5 - Strongly agree

1. When I have money, I cannot help but spend part or all of it. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

2. I am often impulsive in my buying behavior. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

3. For me, shopping is a way of facing the stress of my daily life and relaxing. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

4. I sometimes feel that something inside pushed me to go shopping. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

5. There are times when I have a strong urge to buy. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

6. At times, I have felt somewhat guilty after buying a product, because it seemed unreasonable. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

7. There are some things I buy that I do not show to anybody for fear of being perceived as irrational in my buying behavior. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

8. I often have an unexplainable urge, a sudden and spontaneous desire, to go and buy something. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

9. As soon as I enter a shopping center or mall, I have an irresistible urge to go into a shop and buy something. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

10. I am one of those people who often respond to direct mail offers. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

11. I have often bought a product that I did not need, while knowing that I have very little money left. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

12. I am a spendthrift. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

13. I have sometimes thought "If I had to do it over again, I would..." and felt sorry for something I have done or said. *

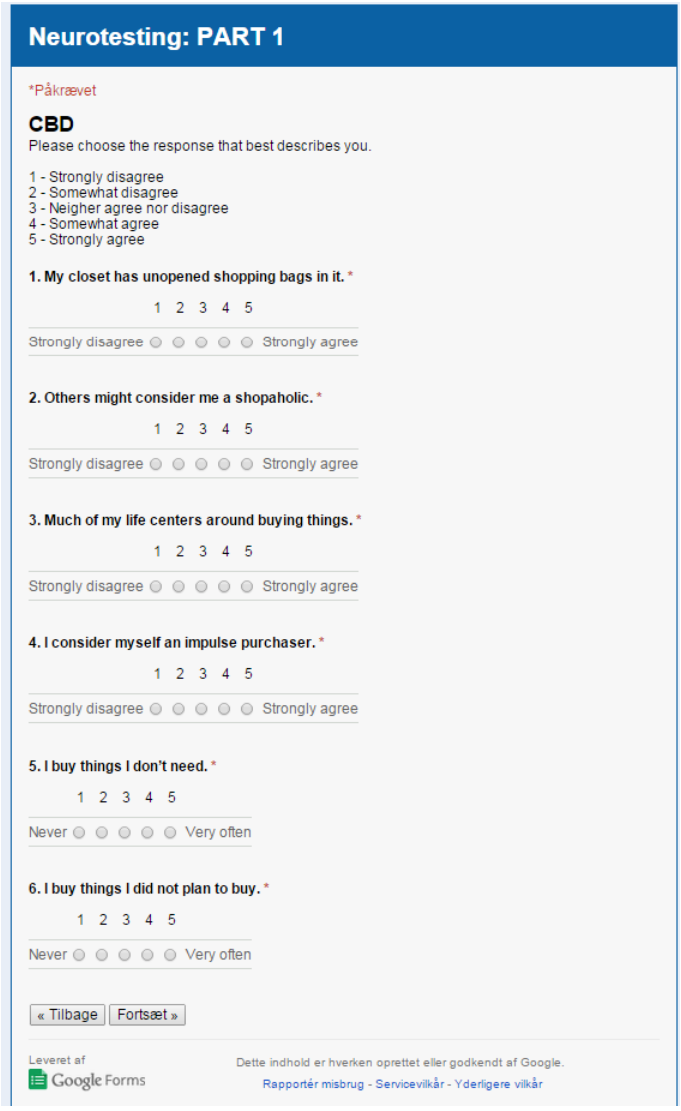
1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

« Tilbage | Fortsæt »

Leveret af Google Forms

Dette indhold er hverken oprettet eller godkendt af Google.
Rapportér misbrug - Servicevilkår - Yderligere vilkår



Neurotesting: PART 1

*Påkrævet

CBD

Please choose the response that best describes you.

1 - Strongly disagree
2 - Somewhat disagree
3 - Neigher agree nor disagree
4 - Somewhat agree
5 - Strongly agree

1. My closet has unopened shopping bags in it. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

2. Others might consider me a shopaholic. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

3. Much of my life centers around buying things. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

4. I consider myself an impulse purchaser. *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

5. I buy things I don't need. *

1 2 3 4 5

Never ○ ○ ○ ○ ○ Very often

6. I buy things I did not plan to buy. *

1 2 3 4 5

Never ○ ○ ○ ○ ○ Very often

« Tilbage | Fortsæt »

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Rapportér misbrug - Servicevilkår - Yderligere vilkår

11.6 Experiment Guideline

1. **Recruitment**

Participants that match the target group are invited to participate in the study saying that it is about documentaries running with the EEG, facial coding, and the eye tracker.

2. **Registration**

Participants are provided with a registration number which is used for inserting all data; both data from the iMotions as well as from the surveys and distraction tests.

3. **Instruction, testing procedure, greeting the subjects:**

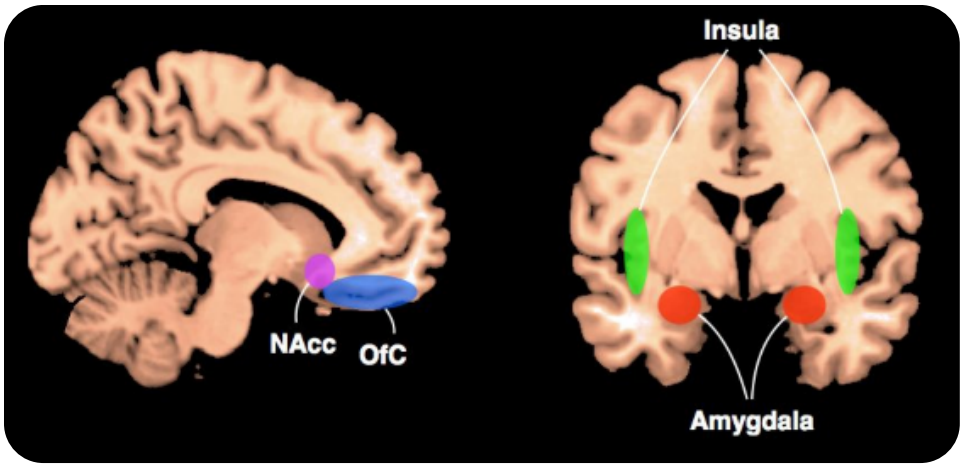
Participants are welcomed and explained what the procedure for the experiment is. Furthermore, they are shown the different measurements and assuring them that the devices are not harmful to their health.

Moreover, guidelines such as the participants must stay still during the experiment are told. If moving too much, the devices might reconnect, why we would lose data.

Finally, the subjects are thanked for their participation and their emails are collected for the lottery. Furthermore, the participants are told to not tell any possible future participants about the purpose of the study.

11.7 Brain Locations Relevant to this Paper

The following section will describe briefly five brain regions that are relevant to this paper; the nucleus accumbens, the opertal frontal cortex, the amygdala, insula, and hippocampus.



Nucleus Accumbens

The nucleus Accumbens (NAcc), also known as the ventral striatum, is a region in the basal forebrain rostral to the preoptic area of the hypothalamus. The NAcc and the olfactory tubercle collectively form the ventral striatum, which is part of the basal ganglia, and basically seen as a structure that is more related to prediction of an outcome; positive and negative (Levita, et al., 2009) (Ikemoto, 2010).

Research has indicated the NAcc plays an important role in the reward circuit, as its operation is based mainly on two essential neurotransmitters; dopamine, which promotes desire, and serotonin, whose effects include satiety and inhibition. It is reliably engaged during reward expectancy, habits, and craving (Knutson, et al., 2007), and has been shown to be involved in desire and approach behaviour (Ramsøy, 2014).

Another example is the nucleus accumbens (NAcc), which is related both to reward and terms of habits. It is part of the pleasure centre, and forms the main part of the ventral striatum, which is traditionally seen as a reward and wanting structure, even though studies have also shown that is responds to (expected punishment). Today it's seen as a structure that is more related to prediction of an outcome; good and bad. It is an unconscious structure, responsible for classical and operant conditioning. It is thought, that emotions guide decisions; the more activity there is in the NAcc, the more likely to buy the product, whereas the more activity in the insula, the less likely to buy the

product. The consumer's emotions select information and work unconsciously by putting an emotion tag on everything that is seen. Therefore, the consumer choice is a process that goes over several seconds – several seconds before people even feel like making a choice (Pessiglione, et al., 2008).

Orbitofrontal Cortex

The orbitofrontal cortex (OFC) is a prefrontal cortex region located in the frontal lobes which is involved in the cognitive processing of decision-making. The anterior cingulate cortex and orbitofrontal cortex are different structures, but are both part of the more general label "ventromedial prefrontal cortex" (Ramsøy, 2014).

The orbitofrontal cortex represents one critical structure in a neural system sub serving decision making. Decision making is not mediated by the orbitofrontal cortex alone, but arises from large-scale systems that include other cortical and subcortical components. Such structures include the amygdala, the insular, and the peripheral nervous system.

The orbitofrontal cortex is associated with emotions, primary visual sensing, bottom-up attention, liking, and decision-making, and integrates sensory and emotional signals to produce a hedonic experience of the world (Ramsøy, 2014).

Amygdala

The amygdalae are almond-shaped groups of nuclei located deep and medially within the temporal lobes of the brain, and are considered a part of the limbic system. The amygdala was traditionally seen as a fear structure, but now performs a primary role in the processing of memory, decision-making, and emotional reactions, interacting extensively with underlying cognitive processes (Ramsøy, 2014).

An example of this is the amygdala, which is involved in processing emotions, and fear-learning. It links to areas of the cortex that process "higher" cognitive information with hypothalamic and brainstem systems that control "lower" metabolic responses (e.g. touch, pain, sensitivity, and respiration). This allows the amygdala to coordinate physiological responses based on cognitive information – the most well-known example being the fight-or-flight response. Therefore, activity in amygdala is highly related to bodily reactions (sympathetic vs. parasympathetic responses).

Modern accounts also show that amygdala is involved in reward as well as negative emotions (Baars & Gage, 2013).

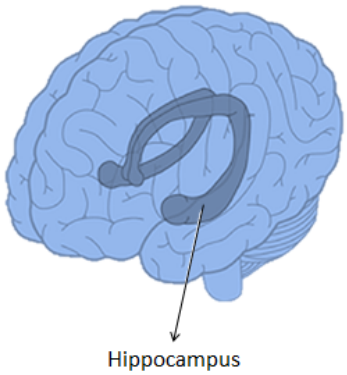
Insula

In each hemisphere of the brain the insula is a portion of the cerebral cortex folded deep within the lateral sulcus. It is therefore usually seen as a hidden part of the cortex, as it lies "insulated" within these folds of each side of the brain.

The insula is believed to be involved in consciousness and play a role in diverse functions usually linked to emotion or the regulation of the body's homeostasis. These functions include perception, emotions, consciousness motor control, self-awareness, cognitive functioning, value-based decision making, and interpersonal experience.

Hippocampus

The hippocampus is located under the cerebral cortex, and located in the medial temporal lobe, underneath the cortical surface. Being the most prominent member of the medial temporal lobe, the hippocampus has long been known to be involved in the kinds of memories that we can explicitly state that we know. It belongs to the limbic system and plays important roles in the consolidation of information from short-term memory to long-term memory and spatial navigation (Baars & Gage, 2013).



Even though the above brain regions are related to the different emotions, several studies have provided a more nuanced picture of these brain regions. For example, many regions show a bivalent response function, while other regions have shown a differentiated signal within smaller clusters of the same region. This is summarised in the table below (Ramsøy, 2014):

REGION	TRADITIONAL VIEW	NEW FINDINGS	References
Amygdala	Fear, stress, aversion	Negative AND positive emotions	Murray, Elisabeth A. "The Amygdala, Reward and Emotion." Trends Cogn Sci 11, no. 11 (2007): doi: 10.1016/j.tics. 2007.08.013.
Nucleus Accumbens	Reward	Negative AND positive emotions	Levita, Liat, Todd A Hare, Henning U Voss, Gary Glover, Douglas J Ballon, and B J Casey. "The Bivalent Side of the Nucleus Accumbens." Neuroimage 44, no. 3 (2009): doi:10.1016/ j.neuroimage. 2008.09.039.
Orbitofrontal cortex	Hedonic feeling of reward	Differentiated responses: - immediate vs delayed reward - concrete and abstract rewards - positive or negative outcomes	Kringelbach, Morten L. "The Human Orbitofrontal Cortex: Linking Reward to Hedonic Experience." Nature Reviews Neuroscience 6, no. 9 (2005): 691-702.
Insula	Disgust, negative emotions	Positive and negative emotions Is highly engaged in most emotions	Craig, A D Bud. "How Do You Feel--now? The Anterior Insula and Human Awareness." Nat Rev Neurosci 10, no. 1 (2009): doi: 10.1038/nrn2555.

As the table shows, the view upon brain regions have moved from a relatively simple view of correlating one mental function to one brain structure to a view that encompasses multiple functions.